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Text to Speech?



Sumod Hajela
Assistant Editor

All the fancy GUIs aside, computers are still, primarily, tools for manipulating text. Most current office and Internet usage is plain text-e-mail, Web pages, chat sessions and documents. Text is no longer the primary way to interact with a PC, but manipulating text is still the primary application for PCs.

The name 'computer' underscores its origin as a pure number crunching machine. Computers would really become useful to those of us non-mathematically inclined when text-capture hardware, or keyboards, became a common and affordable add-on. Keyboards, for all practical purposes, remain indispensable 'human interface devices'. Humans are, of course, far more comfortable working with visual and audible representations of information than with typing and reading.

Now, two fundamental shifts are on the verge—images have an affordable, convenient channel into the PC, thanks to the unstoppable rise of digital cameras. Audio recording has been feasible for a while, but until recently, computers simply didn't have the muscle to transform and wield audio in any meaningful way. More importantly, as communication devices proliferate, we are approaching the bandwidth to move acceptable quality audio and video around almost as conveniently as text—witness the explosive growth of Internet telephony combined with the Web cam.

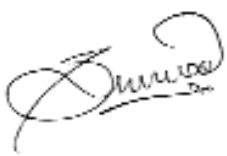
We naturally interact better with audio and visual cues than with creating and using text. As it becomes easier to channel audio, video and images through the PC, it becomes imperative that we have the same level of control over it as we currently do over text.

When you have a terabyte of 'folders' filled with conversation, packaged communications, presentations and video-mails on your 400 GB hard disk, how do you find what you need, repurpose it for other people or situations, reformat it and so on? Where is the Word for video documents? Laptops have audio/visual recording capabilities. Why, for example, are minutes of meetings not recorded? Where is the indexing service for spoken language? How do you find the meeting note where your priorities were discussed?

Communicating out of such a repository is a challenge. Finding interlinks between all that information is a challenge. Simply finding the bit you want out of it is a challenge. Many of these challenges could be fixed by simply throwing a bucketful of CPUs at them. We can't find what we want instantly on our own PCs, because running the software to do that imposes a resource overhead—and that overhead we would currently classify only as luxury.

Processing power needs to significantly outstrip what we have at hand today before this digital age can be real, and it will. To paraphrase James Gosling, the acknowledged father of the Java programming language, "If Moore's Law holds true, and you have a problem that will take current computers a 1,000 years to solve, you might as well go away to a beach for 14 years, come back and solve the problem in one year."

Time to hit that beach.



sumod_hajela@jasubhai.com

"Many of these challenges could be fixed by simply throwing a bucketful of CPUs at them."

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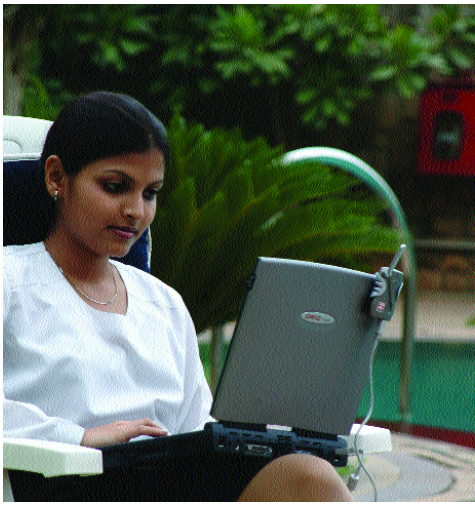


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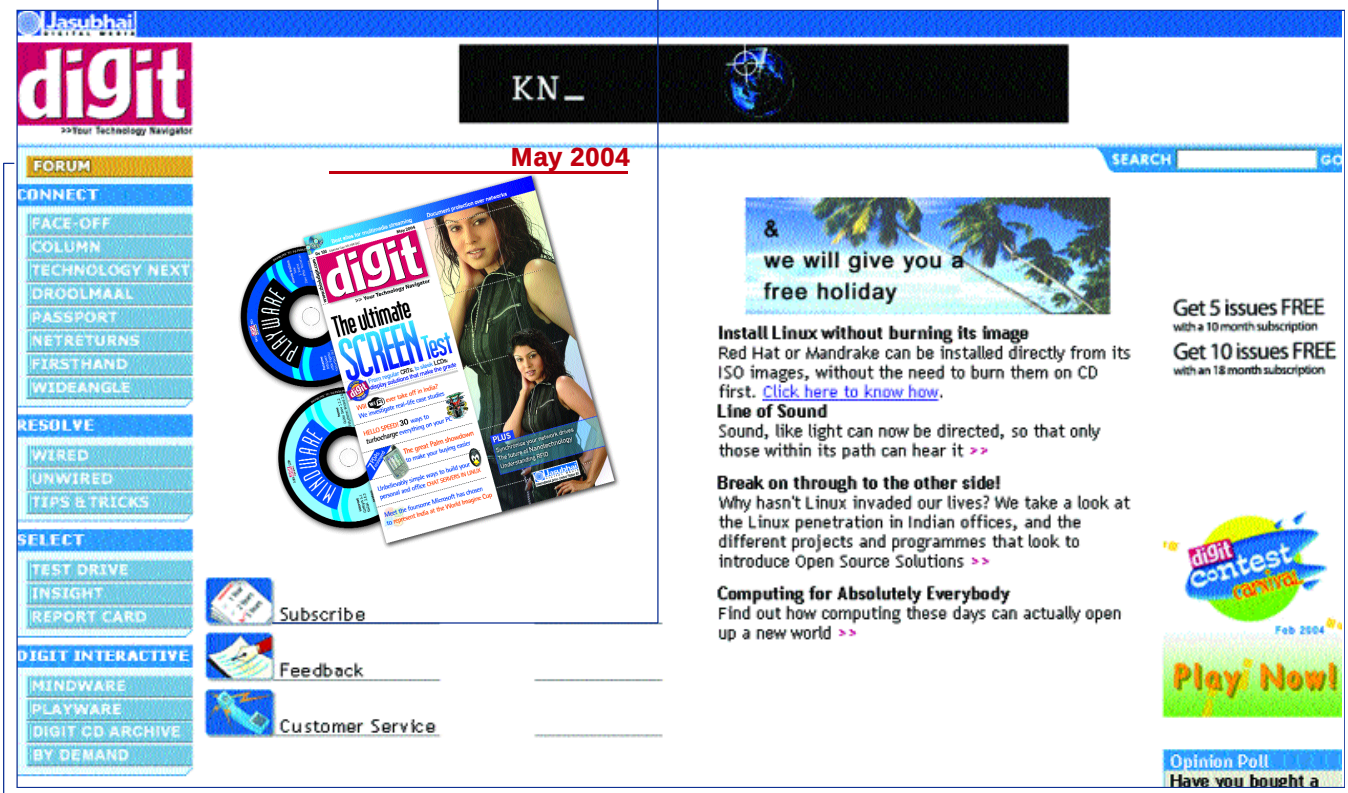
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digit interactive

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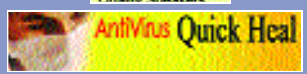
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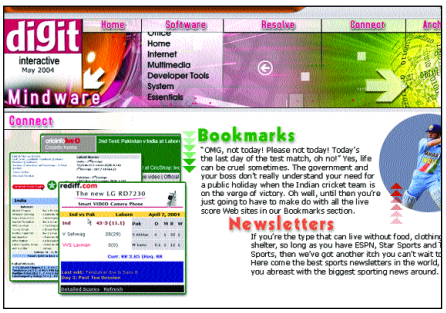
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The Connect section on your Digit CD brings you some fun reading with Bookmarks and Newsletters.

Bookmarks contain sites on a particular subject, along with a detailed description of the sites. This month, we bring you some sites to keep track of live cricket match scores.

The Newsletters section brings you a collection of newsletters on different topics each every month. This month we have some newsletters that keep you updated on breaking news from the sports front.



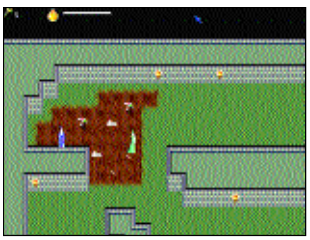
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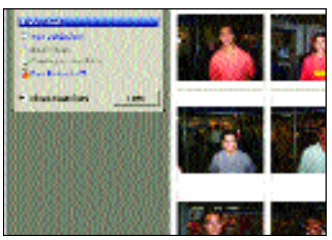
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Mindware

A compilation of useful software across various categories and genres. Something for everybody.

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Talking Reminder 1.6.2 will remind you of your engagements vocally
GetRight 5.1 will boost your download speed even on broken connections
My Mix 1.0 will make smooth transiting audio CDs
Team@Work Professional Edition 1.9 will help your team get organised
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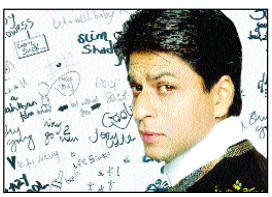
Playware

Bored of that drab PC? Find on this CD, stuff to pamper yourself and your Windows installation

Become a Little Fighter to fight and win in classic arcade style
Watch the latest movie trailers including *Troy*, *I Robot* and *Day After Tomorrow*
Listen to some funky new music from *RemixVillain* and others







hypethesis

Gmail

■ What is it?

Gmail is Google's free e-mail offering. It's not yet publically available, but selected customers have been given accounts for testing and reviewing purposes.

■ How does it work?

When you use Gmail, the text of your e-mails is read by computers, and ads relevant to the subject matter are displayed with your incoming mail.

Google assures us that no humans will read the e-mail, and that nothing that can identify, the sender or the receiver, is given out to the advertisers.

■ What does it do?

Gmail gives an unbelievable 1,000 MB of space. Currently, POP3 and automatic forwarding are not offered.

A sophisticated search engine will help search within archived e-mails. All e-mails and replies are grouped as conversations.

Customers get a spam filter, as well as mail filters.

snapshot

RFID applications deployed will increase 450% in 2005, and a further 96% in 2006

Source: www.evansdata.com

Waiter, there's mustard on my laptop...

And if McDonald's has its way, maybe mayoannaise, tomato ketchup and a little bit of Georgia coffee too could suddenly find residence in the crevices of your laptop's keyboard.

And so dear readers, join your hands in welcoming Wi-Fi connectivity at more than 3000 McDonald's outlets across the US by the end of the year, a trend that we hope find its way into Asia, and also India.

Wayport, an Austin (Texas)-based company, has already provided wireless access to 300 McDonalds outlets as part of a pilot project. It will eventually Wi-Fi all of the 10,000-odd Mac outlets across USA.



Illustrations: Farzana Cooper

McDonalds will charge $2.95 (approx Rs 140) for two-hour access, while regulars can opt for a monthly plan priced at $29.95 (approx Rs 1,350).

Of course, McDonald's is not the first food chain to offer Wi-Fi access. Last year, Starbucks Coffee added Wi-Fi to its already bloated 45-kinds-of-coffee-menu.

Our worry, though, is not about McDonalds or Starbucks making enough money out of renting Wi-Fi services, or the resulting rise in burger and coffee sales. Our worry is how would the users keep the laptop clean as they eat and work simultaneously.

Any ideas?

Happy birthday, spam!

Spam celebrated a decade in April, and we thought we'd tell you 10 things about the 10-year old:

■ The term 'spam' originated in 1937, when Kenneth Daigneau won $100 for coming up with a name to replace Hormel Foods' canned meat-based product, then known as Hormel Spiced Ham.

■ Laurence Canter and Martha Siegel, a lawyer pair, take the credit for sending the first spam mail in 1994, creating what many call the second biggest bane of the Net, after child pornography.

■ The spam business is valued at $20 billion (Rs 90,000 crore) per year.

■ New York became the first state in the USA to prosecute a spammer with imprisonment.

■ The Nigerian spam e-mail (people actually responded to it), is believed to have defrauded Internet users of up to $19.8 million.



■ The first national spam law in US is called the Controlling the Assault of Non-Solicited Pornography and Marketing Act (Can-Spam).

■ The most popular spam pitches include—Viagra, debt, insurance rates, porn sites and online degrees.

■ There are numerous estimates about how much of all mail is spam, but several estimates say that one in six mails is.

■ There is a 16,500 sq ft Spam Museum in Austin, Minnesota, US.

■ Howard Carmack, a US-based professional spammer, sent more than 857 million messages last year. He's been found liable for $16.4 million in damages, along with charges of criminal fraud in New York.

➜

■ VMWare to soon support the 64-bit editions of Windows XP and Linux ■ 3Com opens up engineering design centre in Hyderabad

I've got mail. Now what?

There was kingdom, somewhere far away, which had a troubled king. He was increasingly nagged by a suspicion that his country folk were lacking in civic duty. To put his mind to rest, he placed a rock in the middle of their mainstreet. Days passed by as he watched citizens stumble upon, jump over, swerved from and curse the wretched stone (and the authorities). Everyone thought someone else would move the stone.

Harvard's Greg Barron and Indiana University's Eldad Yechiam are in a similar state of thought, after a study of theirs showed that most online requests get ignored because everybody thought somebody else would reply to them.

They have traced this problem to what they call the "volunteer dilemma", because of which response levels decrease with an increasing group size. The key, according to the researchers, lies in delegating the responsibility to respond. They suggest sending personalised e-mails instead of multiple recipients.

And in a result that may not surprise many, the duo also found out that requests under a female name had a significantly higher response ratio, than those from men.

It would seem that this study would greatly help the booming call centre and IT helpdesks industry, which are often inundated with e-mail requests. But we have a question: Have spammers already perfected this art?

Incidentally, have you ever had a bad experience with IT helpdesks not responding to your queries? Send us your experiences at ***noreply@thinkdigit.com***.

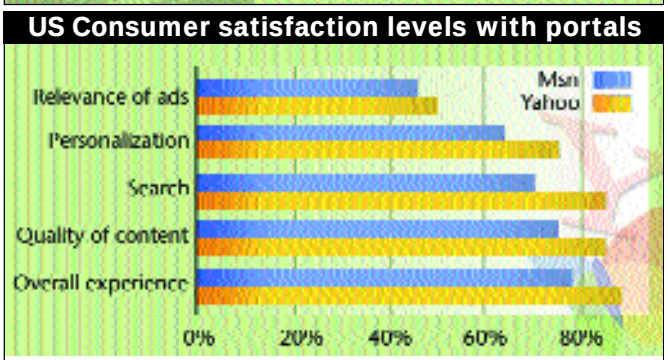
statattack

Total Cost of Ownership of computers in mature and emerging markets



Source: Gartner press release, April 2004

US Consumer satisfaction levels with portals



Source: Forrester Research

Atul Deshmukh

Father of the Web entangled in a million Euros

Thirteen years after he created the World Wide Web, Tim Berners-Lee was awarded the Millennium Technology Prize by the Finnish Technology Awards Foundation.

Berners-Lee, voted as one of the top 100 minds of the 20th



century by Time magazine, won the 1 million Euros (Rs 5.3 crore) award for devising a system to organise, link and browse Net pages—a development that revolutionised the Internet.

Surprisingly, when Sir Tim (he was knighted in 2003), created the hypertext program, he never commercialised his work. Instead, he worked on expanding the use of the Net as a channel for free expression and collaboration.

Pardon the cliché, but the rest is now history.

Sir Tim currently heads up the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology in Boston, where he is now based as an academic.

Well, better late than never, we say!

snapshot

28: average number of items of spyware in one PC

Source: www.theregister.co.uk

redalert

20 Vulnerabilities in Windows

Microsoft has identified 20 new vulnerabilities across various versions of Windows, some of them highly critical.

Most of these can cause execution of arbitrary code. Apart from this, a weakness in LDT—Local Descriptor Table—and an error in Virtual DOS Machine (VDM) can be exploited to access protected memory.

In another vulnerability, an attacker may send a specially-crafted reply to messages forwarded over HTTP Proxy components, and cause a Denial of Service.

Outlook Express, too, is vulnerable. Outlook and Internet Explorer can also be used as attack vectors. Microsoft Jet Database Engine has also been found to have a vulnerability that can be exploited to execute arbitrary code with the privileges of an affected application.

Patches for are available through Windows Update.

Another ActiveX Vulnerability

When someone visits ***www.pandasoftware.com*** for online virus-scanning for the first time, the Panda ActiveScan Control gets installed by Panda ActiveScan on the user's system. This ActiveX control has a boundary error in the 'ReportHebrew' object. Following this, a heap overflow can occur.

Exploitation of this can allow execution of arbitrary code on the user's system.

The vulnerability has been corrected by Panda Software in an updated version of this ActiveX control.

■ SP2P service Morpheus parent company StreamCast Networks offers subscription-based VoIP services, and hardware to make landlines into VoIP phones

Not at all bo(a)ring!

The Truman Show is truly a Peter Weir masterpiece. It has Jim Carrey as the subject of a never-ending movie on his life where cameras follow his every move, and all the people around him—his friends, his wife and the rest of the city—are nothing but actors. The movie was released in 1998, and almost earned Carrey an Oscar nomination.

We will never be able to tell you whether the nameless wild boar family on the Web site **www.wildtiere-live.de** is ever nominated for any recognition, but if popularity is any indicator, then its 56 family members—six grown-ups and 50 offspring—are nothing short of superstars. Just two weeks after the German Hunting Protection League launched the Pig Brother Web site, the porcine family has attracted more than 1.5 million visitors, and over 400 guest book entries.

The site records each and every moment of their lives using a web cam in an enclosure in their natural habitat of the Eifel Mountains in western Germany.

We're glad that the Internet cannot transmit smell as yet!



... And hardware falls down!

Was it just another speech, or did Bill Gates really mean it? It so happened that at the recent Gartner Symposium Itxpo in San Diego, the high priest of the IT world, Bill Gates III predicted that in the next 10 years or so, hardware prices will fall to the point where widespread computing with speech and handwriting won't be limited by expensive technology.

If indeed this turns out to be true, it would have far-reaching implications on the hardware industry. Microsoft, already the world's largest software maker, is now also a big hardware manufacturer, leading the way in tablet PCs and SPOT watches. Gates is betting on the premise that all devices in the future will be tablet-size. Advances in programming will allow software developers to create applications in less time, using visual representations of the inner workings of software, rather than writing lines of programming code.

We think he should have a fair idea about what he is talking, specially since his company spends $6.8 billion (approx Rs 3,000 crore) a year on research.

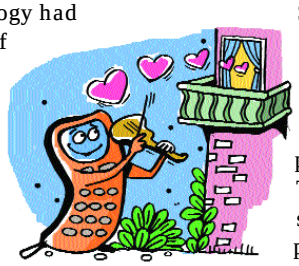
We have an issue with his statement, though. Leading lights have always promised fall in prices, and that has actually happened, but the digital divide is growing wider than ever before.

We see only one reason for this: when prices fall for on product, it so happens that the rest of the world moves to a new standard, and the cheap product becomes obsolete. Take the VCR, for instance. By the time it was affordable to the masses, we had moved to VCDs, and by the time VCD players were with in budget, in came the DVD, and so on.

What are your views? Will the digital divide ever be bridged, especially with hardware? Let us know your opinion at ***billgates@thinkdigit.com***.

Stupid Cupid just went mobile

And you thought the geeks at the Massachusetts Institute of Technology had no heart! A team of young, imaginative scientists have developed a service that would help you find your ideal partner if he or she is somewhere in your vicinity.



All you have to do is subscribe to a service called Serendipity, which then puts you in the database for mobile phone dating. The service stores in their phones, a personal profile and information on what they want from a partner.

If the people whose profiles match are in the vicinity of each other, the service prompts their phones to communicate with the other.

One problem: what happens if there are multiple matches? Now that would be some position to be in! If you believe mobile dating actually works, write in to us at ***mobile-cupid@thinkdigit.com.***

heroes

Linux

Steven Spielberg's DreamWorks Animation will be using Linux for it upcoming films—*Shrek* *Shark Tale* and *Madagas* A thousand computers comprise the HP Utility Rendering Service (URS) which will be used for o site animation rendering and remote collaboratio The URS is based on HP servers running Linux.

Broadband

One-third of all adult Americans now have ac to high-speed Internet connections. A UK ISP h begun a new entry-level ADSL service that costs same as many dial-up services.

British Telecom is stretching the reach of i current service, and will start a 2 MB service late this year.

zeroes

Spam fighting

Spam received by businesses has doubled over the last two years. Analysts say 32 per cent all e-mail sent per day in North America in 2003 w spam. The effect of spam measured in lost worker productivity and wasted resources, and comes to millions of dollars annua for larger organisations.

Sun Microsystems

Sun Microsystems' woes are compounding: a thir quarter net loss of $760 million, and the laying o of 9 per cent of its workforce. There's also t fierce competition from Dell and HP to reckon w

■ Nokia plans to release the N-Gage QD which has a sleeker design and offers better gaming support ■ Iomega releases Rev, a 35GB successor to the Jaz

In the Internet rainforest, search the Amazon

Friend, or foe? It would seem 'friend', but that's what they said about the British East India Company! Amazon's latest search service A9 incorporates search results from Google, and allows users to search Amazon's digital database of published book content.

It works with a simple premise, but as a technology, it is highly complex, with millions of algorithms running in the background.

Amazon's business unit—A9.com Inc of Palo Alto, California—built the service that remembers users' searches, and offers a toolbar that allows them to make and save notes on a Web page—much like a reader might scribble in the margins of a book.

The service, located at ***www.a9.com***, also incorporates lucrative paid-search advertisements from Google, which has been providing search and advertising services to Amazon for a little over a year.

Web search is already a cut-throat Internet business, with dominant players such as Google and Yahoo! now being challenged by Microsoft. With Amazon, we believe, the slice just got a little thinner.

snapshot

For every US$1 spent on offshore jobs, the US economy gets back $1.12

Source: www.theregister.co.uk

And now, bits on paper

So the paperless office is a myth, after all. Sony Corp, the world's leading electronics firm, and Toppan Printing Co of Japan, have developed a new optical disc made mostly out of—hold your collective breaths—paper!

In fact, the two companies even claim that the disc will be compatible with next-generation DVD players, and is capable of storing up to five times more information than current discs, thanks to blue-laser DVD—a technology expected to replace current red-laser DVD players soon.

The paper disc is based on a technology called Blu-Ray, and is supported by a consortium of electronics makers, including Sony, Matsushita Electric, and the Dutch firm, Philips.



In which case, will copying on discs now be called paper recycling?

It's radio and it's visual

Trust Nokia to stretch the boundaries of imagination. The Finnish telecom giant has tied up with HP, along with who they plan to launch a Visual Radio service later this year.

Nokia will supply the content, while HP will provide computing equipment to store the artist and title information as well as promotional information. The service may be subscription based.

Users of the service will be able to view artists, songs, and concerts. Nokia plans to sell both high and low end phones that will connect to the Visual Radio service, and perhaps, at a later date, make available the service to other handset makers.

Well this reminds us of the time when people asked those with mobile phones for cricket scores thinking they have a radio they are hearing near their ears. That age has just come full circle.

RFID is coming

Before you read the piece on Radio Frequency IDentification (see *Beyond Barcodes*, Page 124), here is something to start you off.

Retail giant Wal-Mart, and the US Defense Department have mandated the usage of RFID from their suppliers. Incidentally, a recent Forrester Research showed study showed that RFID suppliers may not be able to meet the January 2005 mandate; Wal-Mart though, refutes the study. Analysts talk of lack of clarity at implementation levels, but many feel that there are going to be rigorous implementation trials over the span of this year. We are waiting for it to happen here, too!

Spam

Beware, Spammer—the Law's here!

Howard Carmack of Buffalo, New York, also known as the 'Buffalo Spammer', became the first spammer ever to be tried in court. He's been convicted on charges of identity theft and falsifying business records, according to the New York State Attorney General. He sent more than 800 million messages using Earthlink accounts.

EarthLink accused Carmack of using e-mail accounts belonging to other people, to send out floods of spam that advertised get-rich-quick schemes, herbal stimulants and cable TV descramblers. Carmack will appear in court on May 27, and faces three to seven years in prison.

Could this precedent act as a deterrent to spammers world-wide?

XXX to be brown-paper-bagged

If the US Federal Trade Commission has its way, you won't be embarrassed the next time you open a mail inviting you to visit a porn site. Starting May 19th, sexually explicit e-mail will have to bear a label reading "Sexually-Explicit:", and the messages themselves cannot contain graphic material.

This step is sure to reduce cases of total embarrassment, such as happen when you inadvertently open porn spam just when your boss is behind you.

snapshot

Germans send 200 million sms and e-mail messages a day

Source: www.theregister.co.uk

➜

Wanna be an Open Source *lakhpati*?

The Red Hat Indian Open has just been declared open, and the prize money is Rs 10 lakh. Jointly sponsored by Open Source leader Red Hat, and IIT Bombay's Kanwal Rekhi School of Information Technology (KReSIT), April marks the start of the Red Hat scholarship programme.

Evangelised by KReSIT's Prof. Deepak Phatak, the scholarship will try to attract the programming prowess of engineering students across India. The Indian Institute of Information Technology Bangalore's Prof S Sadagopan is also involved in it.

If you want to win Rs 10 lakh, you will have to create "world-class" applications in Open Source that will benefit the team at large. These will be judged by a team of experts from KReSIT, IIT Bombay. Red Hat and Prof Phatak, meanwhile, say that all the code submitted would have to be covered by the GPL, LGPL or BSD licenses.

Red Hat India will then fund the winning team to the tune of Rs 10 lakh. A team of mentors from the software industry will guide the students, and the participants will be offered internships at Red Hat.

snapshot

One in six US Internet users have logged on using Wi-Fi or another wireless technology

Source: www.washingtonpost.com

How small can you get?

Open your eyes wide. Really wide. OK, now we will first give the background..*kkrieger* is a first person shooter game, complete with all the effects you'd expect.

There are guns, monsters with detail, different levels, the works. When you fire at the monsters, the weapons light up your enemies to reveal more details. There are shadows, and your ammunition even bounces off floors.

Now comes the time to pop your eyes out as you read this: the size of the game is 96 KB. Not 96 MB, 96 KB!

Surely, then, there is a catch? Yes, you got that right. There are two, in fact.

Firstly, the beta version crashes, there are clipping and collision problems. Second—and listen closely—you need the at least the following: 512 MB of RAM, a 1.5 GHz Pentium 3 or Athlon, a Geforce4Ti or ATI Radeon8500 graphics card supporting pixel shaders 1.3, preferably with 128 MB of VRAM and DirectX 9.0b.

So what do you think? How come a 96 KB game shows all these effects, and why is it so demanding on system resources? If you can figure out how exactly *.kkrieger* does it, write in to ***smallgame@thinkdigit.com***.

tomorrow's technology

Beyond Silicon: Plastic

Xerox, the company whose research labs gave us the computer mouse, is now working on the future of silicon-based transistors—and their vision of the future isn't silicon, but plastics.

US-based TDA research has come up with something similar—they're looking at conductive polymers. Both systems work with technology that has, up until now, seemed impractical, but have come up with workable solutions that could be used in, say, low-quality displays.

The Xerox project works using a molecule that can be used as a semiconductor, and remains stable under normal conditions. Once printed into place, the molecules can orient themselves into the bigger structure. Xerox has also developed two other molecules: one that acts as a metal-like conductor, and another that acts as a dielectric. These form the basic parts of semiconductors, and can be used to make printable chips.

Xerox's PARC been working on an electronic array that can be used as the back-pane for a display, and the plastic semi-conductors could be integrated for low-performance displays.

TDA's solution works on a polymer called Pedot. Pedot can act as a conductor, but gets corrupted by water. TDA re-engineered this by adding two more molecules, and calls this Oligotron. TDA also created a solvent bath that lets users work with the material. The resultant material could be used to make soda bottles that talk straight to inventory management devices.

It's a big market for non-silicon low-cost solutions, and both Xerox and TDA are working towards getting their plastics and polymers to edge out silicon.

quoteworthy

"Despite assertions made by Linux vendors, a Linux cluster is not a high performance computer. At best, clusters are a loose collection of unmanaged, individual, microprocessor-based computers"

Dr Paul Terry, CTO, Cray Canada, at the ClusterWorld Conference & Expo 2004, at San Jose, California, USA.

"…That was just poor wording on our part…stuff that's on tapes, and those are offline – we'd eventually delete it, but we can't guarantee an instantaneous deletion."

Google co-founder Sergey Brin in eWeek, referring to fears about Gmail, Google's 1000 MB free email service, where deleted emails would remain archived on servers.

"I doubt you'd see them settle any frivolous lawsuits, but it looks inevitable that there will be more suits based on the position of Windows in the market"

Richard Donovan, chairman, Antitrust unit, Kelley Drye & Warren, a US law firm. Microsoft had agreed to a presettlement in an antitrust suit regarding overcharging for for Windows and Office

■ Cisco fixes security holes arising from vulnerabilities in LEAP (Lightweight Extensible Authentication Protocol), in their wireless networking products centre

The good samaritan

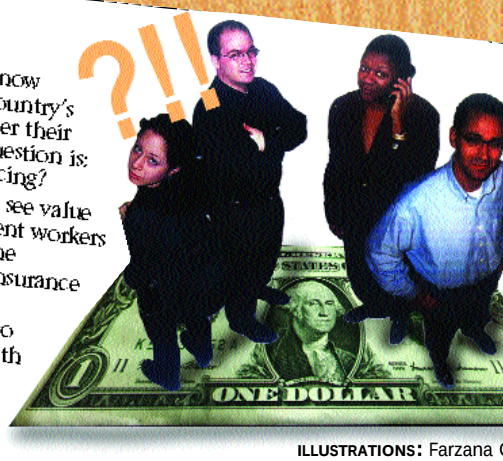
In last month's *Digit*, I read a letter from Ashish Anand who said that he cannot afford all 12 issues of Digit in a year. I feel I can do something for him because he is missing out on something fantastic for six months in a year.

I would like to sponsor him to the extent of Rs. 1000, and if he pays the balance of Rs 800, he will be able to get a subscription for 28 months and save money on each issue too. Then onwards, he can keep saving and keep subscribing if he manages his saved money judiciously.

Ashish Mehta
Mumbai

Dear Ashish,
We have sent you the e-mail ID of the reader from Patna who, we are sure, would love to see that mail.

Outsourcing and America



ILLUSTRATIONS: Farzana

It is ironical that Americans are now scared of outsourcing, and the country's politicians are using this to further their political agendas. Because, the question is: Can America do without outsourcing?

The companies that outsource see value in it, because they get more efficient workers at a fraction of the cost without the additional burden of healthcare, insurance and superannuation.

In fact, it would be interesting to find out how US companies fare with regards to operating profits and their stocks, if the companies they outsource from take leave of absence for a week. We could also monitor its impact on the economy in general, and the common man, in particular.

In return, it would be interesting to let US companies take leave of absence for supply of health care services, medicines and military services to other countries, and look for a global impact.

Here is what I feel could happen:

1. Most banking, insurance, airlines and telecommunications customers would not get any phone services.
2. People would be happy to see a drop in telemarketing calls.
3. Most large organisations will not be able to execute back office processing.
4. Software companies will have to reschedule their delivery schedules, or pay delay penalties
5. Stocks will plummet, as companies start losing customers.

This could happen in the second case:

1. BPO companies will continue providing services to US companies' clien managing the tough customers.
2. People in poor countries anyways h more immunity.
3. There will be fewer terrorist attacks o American allies, lowering the demand for emergency health care services.

I hope, then, the debate on outsourcing will end once and for all.

Ketan Patel,
Auckland, New Zealand

Dear Ketan,
We hope it does not come to that, but your sentimen echoed by thousands of Indians across the world. Americans should now stop complaining of outsourci actually do what they do best—innovate.

What's up with you?

The news piece on Hitach's 400 GB Deskstar 7K400 in the April 2004 issue was surprising. Does your writer think that disk spaces are only for storing readable files? Has (s)he never heard of program files which you never read, but work for you anyway and take up large amounts of disk space? Has (s)he never heard of the enormous need of servers for disk space? Why do you think they use Raids?

A couple of decades ago, someone said that all the memory you would ever need for a computer is 640 KB. He is a much-reformed man today. His name is Bill gates. Is another such genius hiding behind the question: "Why would you want to buy this behemoth?"

K S V Menon

Dear K S V Menon
Rest assured, we do not have a genius of the likes of Bill Gates with us. At least he is not visible to us right now.

We will be happy, however, to be proved wrong, as so many people have been in history.

In the nick of time

Thank you for the April 2004 issue. It came just in t nick of time when I was about to buy a printer. And with so many options around, I was unable to decide Luckily, I read Digit, and did not hesitate to buy the product that the magazine recommended.

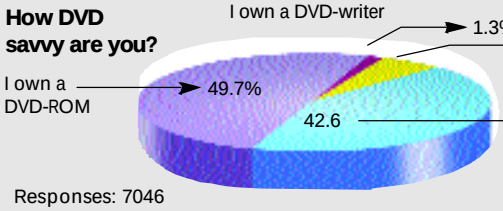
Thumbs up for your good work. Keep the tempo.

Himadri Sarkar

Dear Himadri,
Thank you for your kind words. They keep us m vated. Maybe we can time other products too so the articles are published just in time for you to b

Your vote count

How DVD savvy are you?



Responses: 7046

This month's question...

Google has announced a 1 GB free mailbox. Who among the lowing biggies, if they offer a free 1 GB mailbox, would you p fer the most?

☐ Hotmail ☐ Yahoo! ☐ GMail
☐ Rediffmail ☐ Indiatimes

Log on to www.thinkdigit.com and

No know-how for Linux

I am a not too much of an expert on computers, but I believe that Linux has not moved into the home PC, because of its complex nature and difficult interface.

There are applications for Linux that can be downloaded and installed on the fly, yet for most desktop users, Linux is still an enigma.

My personal experience has been somewhat frustrating—I bought a PC from a reputed MNC with Mandrake Linux 7.0 preinstalled. After a hard drive format, I tried installing Linux with the system engineer, but gave up after we couldn't figure out what to do following the Welcome sceen after booting off the Linux CD. I have since switched over to Windows XP.

This is what I'd like to say—Linux hasn't become popular because there aren't enough professionals who can teach newbies such as me. I'd like to see PC manufacturers train their engineers in Linux, especially since they distribute the OS with their PCs.

It's also quite difficult to get more applications, since the only source of Linux distros and applications are magazine CDs. In a country such as India, with most of us connecting to the Internet via dial-up, downloading large files is impossible.

S Praveen Bharadhwaj

Dear Praveen,
You have touched upon several pertinent points. It is surprising the company's service engineer could not aid you with the install. Yes, companies must make the effort to train their engineers on Linux, and also offer users the necessary skills to get started on the Linux desktop. It's also sad to note that for a quality product such as Linux, software support outside of the distribution is severely limited to a few applications, and updates and patches on magazine CDs.

Swiss army knife in action

Last month, *Digit* asked readers to come up with an innovative way in which the Victorinox Swiss Army Knife USB stick could be used. Here is one:

Suppose you are an extreme sports enthusiast. You take one step too many in the wrong direction, and before you know it, you are lost. Your gear is carried away by the floodwaters, and food is fast running out. It is a race against time, but slowly, Nature gets its death grip on you. The last you remember is you passing out.

A team of rescuers finds you. There is nothing to identify you except the USB Victorinox. The rescue team plugs it into their laptop or PDA, and finds personal data, including the your blood group, contact details, etc.

They radio for help, and soon the rescue machinery is put into motion. You are now safe.

Prof Unnikrishnan Panickar



Dear Prof Panickar
We loved your idea. We hope advent enthusiasts actually use it, and god forb some calamity strikes, they can sa thanks to the information on the USB sti

The Winner of the 'Post your best Planet Digit Experience' contest is...

Deep
Joined: 23 Jan 2004
Posts: 341
Location: Mumbai, India

Posted: Mon Mar 15, 2004 3:06 pm **Post Subject:** GMail

Yes, I haven't made any mistake here... it's 1 GB and that too FREE. I think this shall answer the questions asked before regarding Bigger free mail storage

Quote:
"Google plans to use its search technology and a large amount of data storage to launch a free e-mail service that lets customers keep about 1GB of messages, the Internet search giant announced Wednesday."
Website : ***www.GMail.com***
This is super HOT... amazing.

Dexter
Joined: 24 Dec 2003
Posts: 317
Location: Mumbai, India

Posted: Wed Mar 17, 2004 10:03 am **Post Subject:**

That's an April Fools Day prank. I don't think Google is offering 1 GB... In fact, hours after Google's press release, came the news that Microsoft was gonna give 1 TB of free space. Why? Because it's 1,000 times more than Google!

Dexter
Joined: 24 Dec 2003
Posts: 317
Location: Mumbai, India

Posted: Wed Mar 17, 2004 10:03 am **Post Subject:**

OK, so there's a correction: Gmail is not an April Fools Day prank. Actually I learnt about it right after I posted it here, but it seems that actual prank that Google pulled off was that it was offering a job on the moon...

Goof Ups

- The price for the Ca i225 was mentioned as 3,995 in the Scoreboard page 53. The correct pr is Rs 4,500, after taxes.
- The picture of the graphics card in the A-l on page 76 should hav been the Ennyah GeFo FX 5700, instead of the Compro card shown.
- The Ennyah GeForce 5700 was also the caus a Expensive-Cheap confusion. As a value performer in the A-list, card is expensive. But compared for pure performance with othe cards in that range, it's is justified.

Notice any goof-ups?
Write to goof@jasubhai.com

E-mail: readersletters@jasubhai.com
Send your letters marked 'Readers Letters' to the Digit office:
D-222/2, Om Sagar Building, MIDC, TTC Industrial Estate, Nerul, Navi Mumbai 400 706
Phone: 022-27629191/9200 Fax: 022-27629224



VIPUL SHAH

Upgrade from Broadband to Dial-up

> "India was probably the only country where downloading pirated MP3s was more expensive than buying the original CD"

Pre-1995, the Internet was not officially available to most mortals in India. You'd have to cheat your way through NCST disguised as a Unix student, and get access to their HP-9000 connected to the Internet.

VSNL made the Internet available in 1995 via the UNIX shell, and later on, in 1996 through TCP/IP dial-up accounts, operating at 9,600 bps. Up until 1999, we used dial-up Internet, operating at 56 Kbps. The cost was exorbitant: the phone call charges, coupled with the ISP's charges, made for Rs 30 per hour of Internet usage.

In 2000, Internet access via cable modem, became available through the local cable mafia. These services proved popular: 33 Kbps always-on unlimited Net usage for about Rs 300 per month, and 64 Kbps for Rs 900. The service was not perfect, and there were downtimes; but this was, any day, better than the phone bills that ran into thousands.

The year 2002 saw such corporate national ISPs as Hathway and Sify emerge as major broadband providers. Sify started branding and managing cable-owned ISP operations. Cable operators became resellers for these ISPs, and the ISPs got the go-ahead from the cable mafia to operate in their areas.

And then, suddenly, they informed you of the good news: instead of paying a flat monthly rate, you'd pay for only what you use—and that would be like Rs 2 or 3 per MB of data transfer.

People now began using their always-on broadband connections very carefully, to just read e-mail or news, and avoided all bandwidth-hungry applications—contrary to the concept of broadband.

Since the only alternative was very expensive dial-up, this Rs 2-3 per MB racket continued until late 2003. India was probably the only country where downloading pirated MP3s was more expensive than buying the original CD: a 72-minute MP3 file download would cost in the region of Rs 170, whereas the original CD sells for much less.

Then, out of nowhere, MTNL (Mumbai) announced phone lines for Rs 500 per month for unlimited calls to any ISP. If you used Rolta's unlimited plan, it would cost Rs 500 for the MTNL line, plus Rs 170 for the Rolta plan, totalling Rs 670 a month for a 24-hour 56 Kbps connection. Compare this with Sify's best offer of Rs 999 per month for 32 Kbps unlimited; Or you could opt for Sify's 128 Kbps packages, where it's still more than Rs 2 per MB of usage. Looks like it's time for people to abandon their 'Broadband 32 kbps' connection, and upgrade to 56 Kbps dial-up.

When I spoke to Sify for this column, the response I got was, "Sify's focus is providing broadband services at 64 kbps and above. Sify's rate of Rs 2 to Rs 3 per MB is appropriate given the quality of service and user experience."

Broadband ISPs in India have their problems. They don't like the cable mafia through whom they operate, but they don't have a choice. The government has been sitting over proposals to open up phone lines for DSL to ISPs like it is all over the world. And that leaves cable as the only viable mode of delivering bandwidth to residences. International connectivity for these ISPs is still a duopoly, which keeps bandwidth prices many times what it costs in other Asian countries. Peering of traffic by national exchange is strongly resisted by the largest ISPs, and so data from one Indian ISP to another usually travels via the USA or Europe.

India is the only country where cable monopolies are created and encouraged because of government inaction. As the world moves from dial-up to cable internet, the exact opposite is happening in India. Every minister in this country takes a keen interest in changing or manipulating the voice traffic infrastructure, but data traffic infrastructure has received step-motherly treatment from the government and from TRAI (Telecom Regulatory Authority of India)

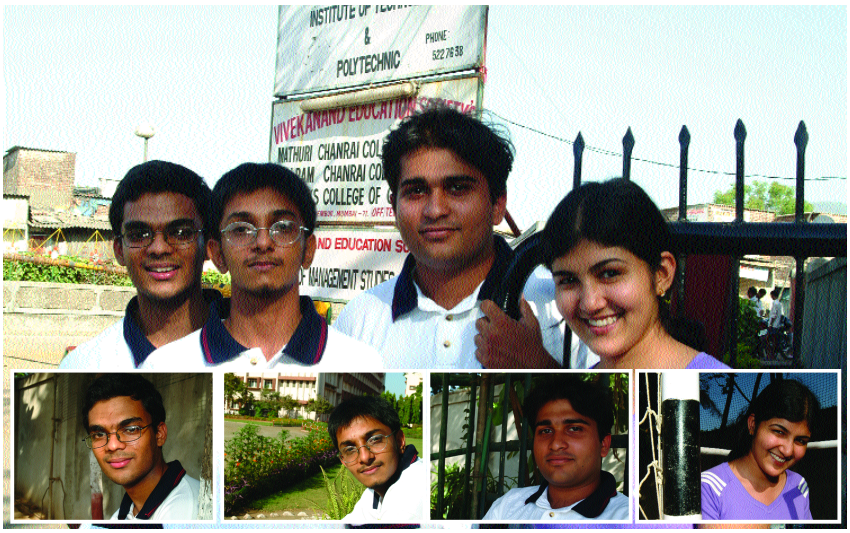
In the US, AOL executives have spent years of sleepless nights over the erosion of their dial-up connectivity market share to the competition—cable internet. No such fear in India.

Did I hear someone say "India Shining"?

Vipul Shah is a chartered accountant who writes and consults on Internet, e-commerce, banking and finance technologies. He can be reached at digit@vipulshah.com

Imagine, all the coders

Michael Eisner, the celebrated CEO of Walt Disney Inc, may be in trouble these days with his shareholders, but his record is impeccable. He made his company from a faltering legend, to a dominating entertainment giant, more than quadrupled revenues and profits, and brought the magic back in the Disney name.



The Geek4: (left to right) Tejas Shah, Sailesh Ganesh, Abhijeet Akhawe and Jyotsna Rathore, when we caught up with them on their college campus in April 2004

> "The application will bridge the gap between what is taught in institutions and what the real industry is all about"

One of his revolutionary moves was, however, not related to his money-making ability. It was coining a different name for the immensely-talented people at Disney—Imagineers.

It will not be incorrect to call Mumbai-based Vivekananda Education Society's Institute of Technology-trained Tejas Shah, Jyotsna Rathore, Sailesh Ganesh and Abhijeet Akhawe imagineers. They are the only four to represent India at the world finals of the Microsoft Imagine Cup this July in São Paulo, Brazil—an annual competition where college students from all over the world display their .NET applications to vie for the top prize—$ 25,000 (Rs 11,25,000).

For the national finals in Bangalore last month, the quartet came up with Gurukul, an e-learning application that aims to "simplify lives of students".

Just a couple of months before they embark on a tour that could make their career, Digit met up with the Geek4 at the holiest of all college environments—the canteen. Excerpts from a free-wheeling interview:

■ So how did Geek4 form?

Tejas: Abhijeet and I had participated in last year's Imagine Cup; we were the runners up in Barcelona, Spain. (Smiles) We thought people might be bored of seeing the same faces, so we roped in Jyotsna and Sailesh.

Sailesh: I was interested the moment I heard Brazil!

■ What is Gurukul all about?

Jyotsna: Gurukul is a sort of virtual university—an interface between students, teachers, industry and universities. It tries to simplify the lives of students.

Tejas: You could access your university sitting in a cyber café, talk to professors and students, and find mentors. It's the right place to clear doubts.

■ What differentiates Gurukul from other e-learning software?

Jyotsna: Gurukul has some good features; search, for instance. The Idea Search prompts a user to look for more than the usual. For instance, a student interested in a diode might be interested in transmitters, too. It's smart enough to pick up on behaviour, and provide results accordingly… it's a wrapper around the sort of search technology that Google uses.

Tejas: Other features include workspaces for students and tutors. The spaces allow students to work on their projects, chat for reference, and also seek guidance from lecturers or the industry. Another feature is mentoring. A student can approach any industry professional or an academic who could be the mentor.

Abhijeet: The application will bridge the gap between what is taught in institutions and what the real industry is all about.

Let's say you would like to have access to certain hardware, such as the upcoming (Intel) Tejas architecture. With the terminal services feature built into Gurukul, students can log into the remote machine and access it.

Sailesh: There is also localisation in addition to its bilingual nature. Since equal importance is given to both Hindi and English, it has the potential of mass reach.

Gurukul will allow students to refer to e-books within the portal. Our application supports the tablet interface too.

■ E-books? Won't that create copyright issues?

Tejas: Microsoft is working on Digital Rights Management (DRM) controls for distribution of e-books. The (legally available) e-books that we have within Gurukul, allow the user to highlight, add comments, and annotate all over. There are copies of the textbooks always available for reference.



PHOTOGRAPHS: Jiten Gandhi

> "... we have to win, or come back and face a thrashing!"

■ **Did your lecturers, or anyone from Microsoft, help you?**

(All laugh) **Jyotsna:** This year, the college gave us 17 days of attendance, and that was the biggest help!

Abhijeet: Well, the lecturers could not help us much in this regard. The syllabus covers C and C++, and I guess we needed much more than that!

Tejas: Hardware! The college lent us an O2 XDA! Microsoft was helpful too.

Last year, Homi Bhadra (a software architect with Microsoft) mentored us. We have been in touch with him over the past year, and this year we continue to seek his guidance.

■ **Who does what in Geek4?**

Jyotsna: Abhijeet and Tejas are the core coders.

Tejas: Sailesh and Jyotsna worked on the presentation.

■ **Surely there were some hurdles?**

Tejas: Administrative! (They all smile) Last year, we informed the college pretty late and had to run around a bit to get the paperwork in place. Oh yes, they confiscated my cell phone too! (He still hasn't got it back!)

Jyotsna: The entire project took shape at Sailesh's home.

Abhijeet: Thanks to Sailesh's folks, we got the whole place to ourselves.

Jyotsna: And I was allowed to come home by 10 pm or later!

■ **How were you judged?**

Tejas: We are marked on five parameters—smartness, innovation, commercial value, social responsibility and presentation.

■ **How were the Bangalore finals?**

Jyotsna: We won on the smartness and innovative quotient, but not before Tejas' laptop crashed.

Tejas: (Laughing away) Have you ever heard of a Pentium 4 laptop with 512 MB of RAM crashing? This one did!

■ **How were you guys rewarded?**

Tejas: We all won pocket PCs. Microsoft has promised to give us Longhorn when it is launched!

Sailesh: Microsoft gave us licensed copies of their operating system, Visual Studio, Office... all of that! We have no pirated copies of any software!

■ **So what's the agenda for Brazil? Any more tweaking or fine-tuning?**

Tejas: We have to refine our Idea Search and make it customisable. A mouse for a medical student and a computer professional would hold different meanings. There are some really good teams and this time, we have to win, or come back and face a thrashing!

■ **What else will happen at Brazil?**

Abhijeet: Well, the competition is going to be held at São Paulo...

Tejas: ...which is just 200-odd Km away from Rio...

Sailesh: Oh yes, Brazil, Rio...

■ **Post-Brazil, what do you plan to do?**

Tejas: We've all got jobs...

■ **And the big picture...what do you folks have in mind?**

Abhijeet: Coding...

Tejas: Coding, of course...Longhorn!

Jyotsna: Thinking about taking an MBA...

Sailesh: Well, not thought too much...love maths, thinking of studying that.

■ **Open Source, anyone?**

Abhijeet: No particular preference, I am comfortable with anything.

Jyotsna: Ditto.

Tejas: Closed source. I was (emphasises on 'was') playing around a bit with Linux, but now its .NET. So yes, totally closed source.

Sailesh: Same here.

■ **Why closed source?**

Tejas: I get to hide my bugs!

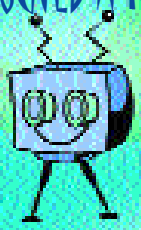
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The Future is Small

THE TERMS

A nanometre is a billionth of a metre—about five atoms wide. Nanotechnology brings together physics, chemistry, electronics, computer science and biotechnology. It refers to the technology that designs and fabricates nanosytems—systems on the nanoscale, that is, on a scale of nanometres. A nanocomputer is one that uses components only a few nanometres large.

HOW DO YOU BUILD A NANOCOMPUTER?

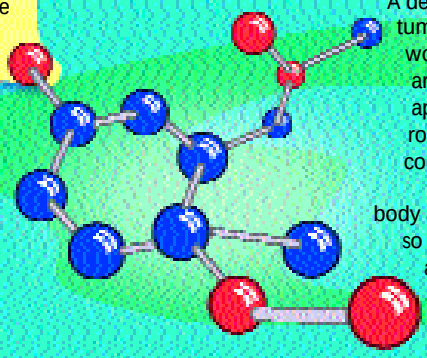


There are four different approaches to building them. The first is electronic: Keep shrinking transistors, and then do something different when they reach the nanoscale.

The second employs quantum physics: A desktop quantum computer would be millions of times faster than your desktop, and might even operate in other universes. The third approach is mechanical—imagine tiny gears, tiny robotic arms and so forth, floating around, doing computations and other things.

The fourth kind is the weirdest: The cells in your body are probably doing some computing to stay alive, so someone thought of using cellular material to build a computer.







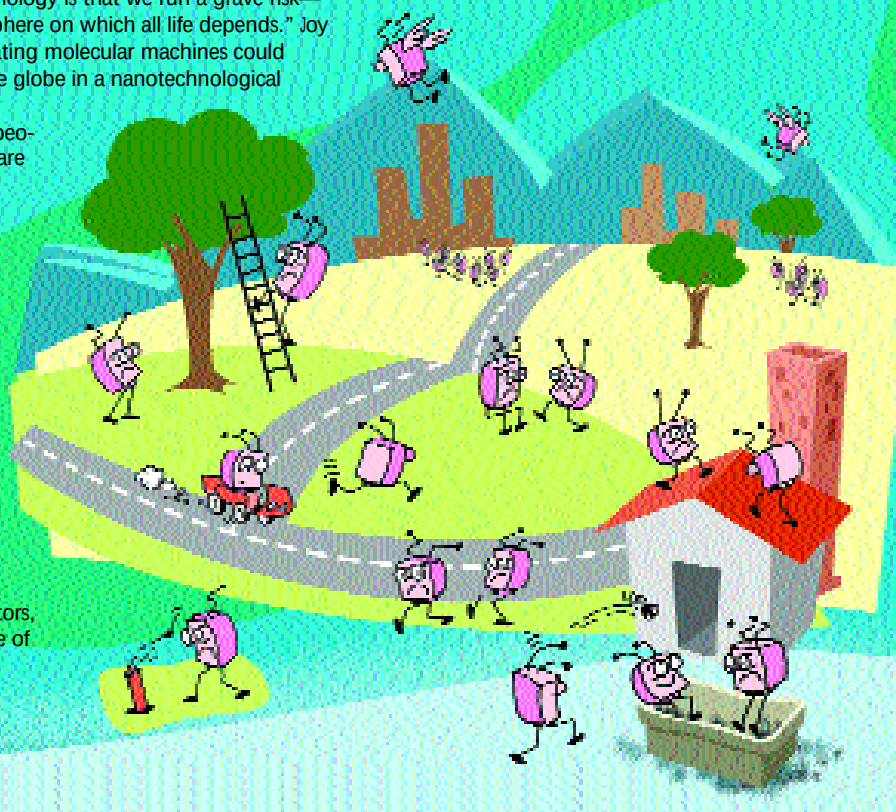
GRAY GOO

"Gray goo: n. A hypothetical substance composed of large numbers of sub-micron-sized, self-replicating robots programmed to make copies of themselves out of whatever is available. The image that goes with the term is that of the Earth's entire biosphere being eventually converted to robot goo. This is the simplest of the nanotechnology disaster scenarios ..." *(from 'The Jargon Dictionary,'* ***http://info.astrian.net/jargon/)***

After some scientists began looking seriously at the idea of building nanobots that would manipulate nanothings, Sun co-founder, Bill Joy, came up with this: "An immediate consequence of the … bargain in obtaining the great power of nanotechnology is that we run a grave risk—the risk that we might destroy the biosphere on which all life depends." Joy also said that left unchecked, self-replicating molecular machines could endlessly copy themselves, engulfing the globe in a nanotechnological 'gray goo.'

Gray goo has been a worry to some people. Doomsday theories about nanobots are rife. But D-day apart, there are scientists who believe that nanobots can't ever be built. Some, such as Caltech physicist Stephen Quake, simply dismiss nanobots as science fiction. Others quote quantum mechanical principles to prove that we can never have control at the atomic level. However, the strongest argument against the possibility of nanobots comes from Richard Smalley, a Nobel prize-winning chemist. In 1999, he was a proponent of nanotechnology, but in 2001, he wrote in an article in *Scientific American* that such control would not be possible.

Inventions such as the DNA hand at LMU (*see 'Recent Developments'*) will heat up the debate. Remember, the DNA hand, according to its creators, will be capable of building nanothings a couple of years from now!



Experience is the best teacher, but not in technology, until recently. Find out how a 250-year-old theorem is being employed in today's systems to make use of the knowledge of the past

DNA COMPUTING

DNA molecules can compute, as Dr Leonard Adleman, theoretical computer scientist and professor of computer science and molecular biology at University of Southern California, discovered in 1994. His experiment involved finding the answer to a graph theory problem: The vertices of the graph were encoded as DNA sequences in a test tube, and massively parallel bio-chemical reactions resulted in combinations of these sequences. These combinations translated to the huge number of paths through the graph. The problem was to find a particular, 'correct' path.

Adleman was actually able to find it, by decoding the resulting sequences according to the laws of biochemistry. The DNA strands had behaved like a parallel-processing computer.

Research expanded the scope of DNA computers to a broad class of problems. The strands in a DNA molecule are much more densely packed than the processing units in a regular computer. In fact, one millilitre of DNA can theoretically perform 10^{22} operations per second. And that's where the potential of DNA computing lies—massive parallelism.

Here's how it works: In a living cell, DNA is operated upon by enzymes that are made up of proteins that 'understand' DNA. These proteins can operate on DNA—cut a strand away, make a copy, paste a strand somewhere else, and so on. The trick is to manipulate these operations. So, just as regular computers or calculators add, subtract and so on, DNA computers have their own set of operations—cutting, copying, etc. Thousands of these operations occur at the same time in a test tube, and so the computation is massively parallel.

Here's Artificial Intelligence from natural resources: Dr David Stenger of the US Naval Research Laboratory, and Dr James Hickman of Science Applications International Corporation, are linking actual, living neurons into a bio-electronic computer.

Drs Stenger and Hickman believe that this bio-electronic mutant might solve pattern-recognition problems. Humans are good at pattern recognition, and it's their neurons that do the job—so why not get them to do something on their own?

RECENT, INCREDIBLE DEVELOPMENTS

Nanodroplets: Researchers from the University of Texas M.D. Anderson Cancer Center created a programmable bio-chip that uses an array of electrodes to place water droplets on a surface, insert substances into them, and move and merge them as well. That doesn't sound great, but the 'droplets' can be 0.5 to 65 'nano'litres in volume. Applications are chemical and biological: The droplets can serve as carriers for cells, genes, and viruses.

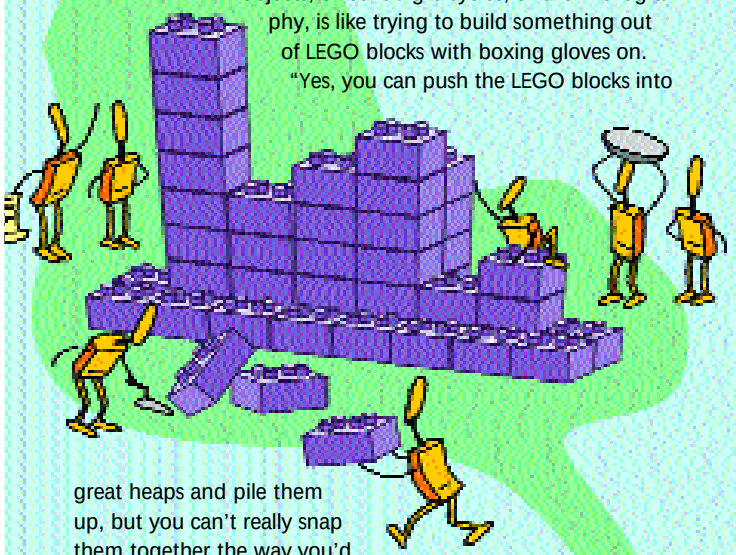
Molecular Logic Gates: Researchers from the French National Center for Scientific Research (CNRS) and University College, London, devised a scheme to design logic circuits within individual molecules. It includes connecting a pair of benzene molecules to two gold electrodes, and the setup would be a real logic gate comprising two inputs and an output. The 1s and 0s here would be the rotational positions of the nitrogen and oxygen atoms in the benzene molecule.
Timeframe: 10 years

Magnetic Tweezers: Scientists at National Institute of Standards and Technology, based in Gaithersburg, Maryland, have demonstrated magnetic tweezers that can stretch, twist and uncoil **individual** bio-molecules such as strands of DNA. These work in conjunction with a special microscope. Imagine what manipulating individual molecules can do for bio-medical and forensic research!

The DNA Hand: In March this year, researchers from Ludwig Maximilians University (LMU) in Germany built a DNA molecular machine that binds to, and releases, **single molecules** of a specific type of protein. The DNA 'hand' can be made to select one of many types of protein, and at some point later on, be used to construct materials or machines, molecule by molecule. According to these researchers, the hand can be used in simple nano-construction applications in two to five years. This is reminiscent of the nanobots scenario—see the next section, 'Nanobots'—automated building of things molecule by molecule. Trust German engineering!

NANOBOTS

Nobel prize-winning physicist Richard Feynman said in 1959, "The principles of physics, as far as I can see, do not speak against the possibility of manoeuvring things atom by atom." This is essentially the principle behind molecular robotics, or molecular nanotechnology, which might ultimately produce nanobots. Dr Ralph Merkle, one of the pioneers of nanotechnology, says that the engineering we do today—grinding objects, or building bicycles, or even lithography, is like trying to build something out of LEGO blocks with boxing gloves on. "Yes, you can push the LEGO blocks into great heaps and pile them up, but you can't really snap them together the way you'd like." With nanotechnology, he says, we will be able to fabricate "an entire new generation of products that are cleaner, stronger, lighter and more precise." Molecular nano aims at no less than controlling the assimilation of things—computing machines, robots, or whatever—atom by atom. Here is where nanobots come in—if someone or something has to fabricate a device at the atomic level, it would have to be something really small, something measurable in nanometres. Also, it would be essential for fabricated devices to self-replicate to keep costs down: The nanobot will manufacture one device, which will self-replicate as many times as one wanted it to, thereby creating a collection of those devices. Here's where the gray goo comes in.



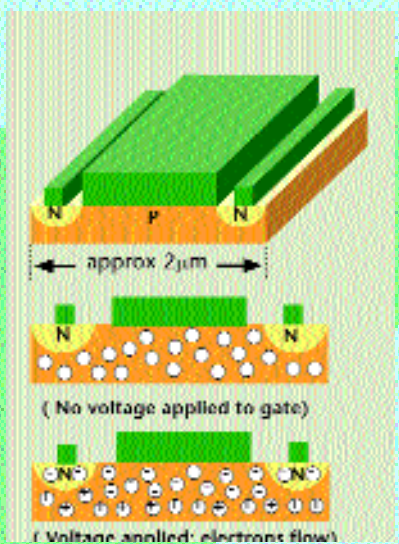
Merkle, along with Eric Drexler—the author and researcher who pioneered the field of nanotech—envisioned a long time ago that a mechanical nanocomputer would operate somewhat like a vastly scaled down and programmable version of a mechanical calculator. But why do we need nanomanufacturing? What would its impact on the computing industry be? Smaller, faster computers, of course. Merkle says that molecular manufacturing "should let us make computers at a manufacturing cost that's less than a dollar per pound, operating at frequencies of tens of gigahertz or more, with linear dimensions for a single device of roughly 10 nanometres, high reliability, …"

The mechanical approach to nanocomputing has been severely criticized by many. It also happens to be reminiscent of Charles Babbage's famous Analytical Engine, which many call the first computer.

TODAY'S TRANSISTORS

Today's computers represent, and manipulate, 1s and 0s using physical devices measured in microns. (So we're still in the 'microworld', as opposed to the 'nanoworld') These devices are transistors, and the trick involved in shrinking computers has been, mostly, to make transistors smaller and smaller, and pack them more closely together.

What is fundamental and useful about transistors is the fact that they can be put in one of two states—a '0' or a '1'. Most transistors used in modern computers are MOSFETs—a MOSFET is basically like a gate that's either open or closed. See figure below: when no voltage is applied to the gate (in green), electrons do not flow between the two 'N' regions, there's no current, and the transistor is 'off'—representing a 0.



When a voltage is applied to the gate, the 'electron carriers' in the 'P' region allow a current to flow between the two 'N' regions, and the MOSFET is 'on'—representing a 1.

The MOSFET keeps getting smaller over the years, but there's a limit on how small it can get for this mechanism to work. Three things—thermal voltage, heat and tunnelling—impose these limitations. Thermal voltage refers to the voltage that's around us all the time—25mV at room temperature, to be precise. As the transistor gets smaller, this thermal voltage effectively acts at a shorter distance, resulting in an increased electric field. When the electric field becomes high enough, the transistor can suffer an avalanche breakdown—a huge surge of electrons that cannot be controlled. And once that happens, the transistor goes kaput.

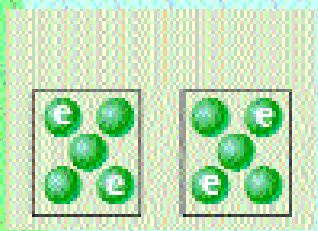
The second limitation on the transistor size is heat dissipation—that's what you use heat sinks for. The smaller the surface on which you apply, say, five volts, the more the heat generated. If it's not dissipated, it melts the chip. And there's no way to dissipate the kind of heat that will be generated by today's transistors if they were packed together on the nanoscale. The third problem is tunnelling, the quantum-mechanical process by which electrons flow between two adjacent transistors. If this happens, the transistors will no longer hold the bits they're supposed to.

If the problem is how to go about miniaturizing circuits further, down to the nanoscale, new methods must be used. Two of these are the resonance tunnelling diode (RTD), and the single-electron transistor (SET). Both operate using the tunnelling effect, and so, cannot suffer from the limitations imposed by the tunnelling effect. The RTD and the SET can therefore be built on a smaller scale than a regular MOSFET.

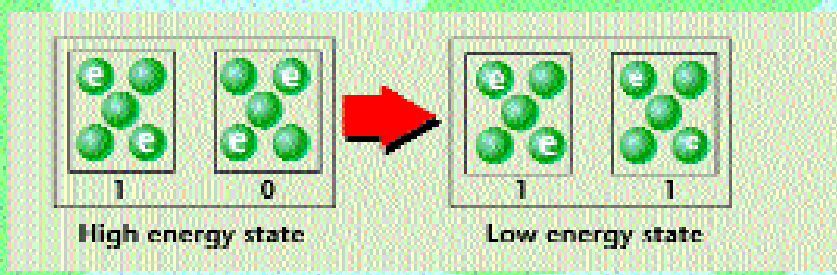
Stringed Quantum Dot Cells

An more interesting approach towards shrinkage is using quantum dot cells (QDCs): A quantum dot (QD), is like a tiny box that contains a certain number of electrons, and a QDC is a box that contains, say, five quantum dots, as below. Electrons repel each other, and the QDs that contain electrons move to opposite corners of the cell. This means they can be in one of two states, as below. When two QDCs of different states are placed next to each other, they are in a high energy state, because of their polarization properties. They tend to get into the low energy state by becoming of the same 'type', that is, with both of them having their electron-containing QDs at the same corners. The high and low energy states of pairs of QDCs can be 1s and 0s.

Using this property, a circuit without any 'real' current can be made by stringing QDCs together: polarize one in a particular way, and the others, like dominoes, become polarized the same way.



It turns out that logic gates, such as AND and OR, can be built using stringed QDCs, without the need for transistors. These gates can be very small: A single logic gate made of transistors, as they would be in 2010, would take up forty times the space than one made of QDCs would.

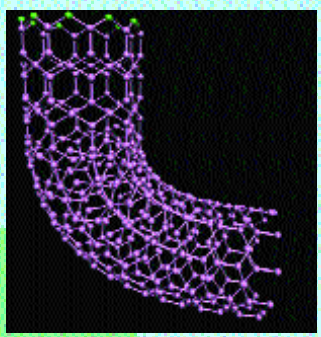


Nanotubes and NRAM

Applications of QDCs are still some time away. Closer to today, Nano RAM (NRAM), being developed by a company called Nantero, based in Woburn, Massachusetts, may be out any time now.

NRAM is non-volatile, like Flash memory, so your computer can boot up within a second. The chips would run at 2 GHz, and last virtually forever. The concept behind NRAM is simple: combine carbon nanotubes—a molecule of carbon atoms connected like a tube and sealed at both ends (see figure below)—with traditional semiconductor techniques. Ones and zeroes revisited: A nanotube is bent using electrostatic forces so that the top touches the bottom. Bent nanotubes can be unbent, too. Bent means a 1, and unbent means a 0. And billions of nanotubes can be squeezed into a four-inch wafer.

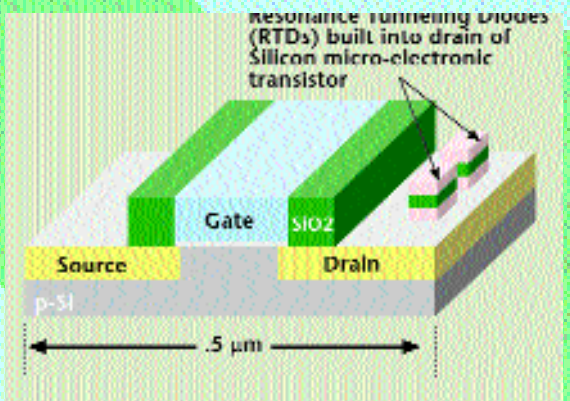
Nanotubes will find their application in high-resolution flat displays too—it's been discovered that nanotubes can emit ring-shaped electron spurts under certain conditions, and electron emission is basically what's required for a display device.



The Nanofuture Now

Alan Seabaugh, and his colleagues, of the Nanoelectronics Laboratory at Santa Clara University, USA, came up with an idea that could thrust us into the nanofuture right now—a hybrid transistor that belongs both in the micro and nano worlds. It's the Resonant Tunnelling Transistor (RTT) (*see figure 'Resonant Tunnelling Transistor'*). The RTDs increase the number of logic states that the transistor can be in, and this increases the 'logic density' on a chip. The RTT may be employed in commercial terabyte DRAM chips as early as 2007. Terabytes, not gigabytes.

With the shrinkage made possible by the RTT and other resonant tunnelling devices, we can expect Moore's law to continue unhindered for another generation!



We'll Live to See It Happen

If the last century was the century of the computer, this one could well be the century of nanotechnology. Some people say nanotechnology is 'the' technology of the future.

Advances are happening so rapidly, one can't tell when a major breakthrough is just round the corner. Keep an eye out for developments at sites such as ***kurzweilai.com***, ***eetimes.com*** and ***nanotech.org***.

Quantum computing is something else altogether: when it becomes a reality, it will change the way we look at reality forever. Closer to today, nanoelectronics is already promising to extend Moore's Law. Of course, there are nano-naysayers, but research dollars are pouring in by the barrel.

Nanotech promises a lot of things, but above all, it promises to make faster computing machines—a promise we'll probably live to see fulfilled.

RAM MOHAN RAO
ram_mohan@thinkdigit.com



◀◀ Panasonic SV-AV100 D-snap SD camcorder

The smallest of them all

The SV-AV100 claims to be the world's smallest MPEG2 camcorder, but we don't know if there's a Guinness entry for that yet. At 1.25 x 2.125 x 3.5 inches, it's possible! You get DVD-quality video, and a remote!

Price: US$ 700 (approx)

Here's a clique that promises to delight your ocular senses

Lens High

Logitech Pocket Digital

Is it just me, or is that a credit card? ▶▶

This credit-card-sized pocket digicam slips into your shirt pocket. It stores up to 52 pictures at 1.3 megapixels. The Autobrite image-processing feature ensures good snaps in bright, as well as dim light.

Price: US$ 99



The Digital Dream JB1 Camera ▶▶

Mr Bond would approve

A pocket spycam, the JB1 digital camera masquerades as a Zippo lighter, in typical 007 fashion. It holds up to 150 pictures at a resolution of 640 x 480, and records up to 30 seconds of video and 12 minutes of audio. You can even send live undercover video over the Internet.

Price: US$ 99.99



©2004 Digital Dream.Com Ltd



◀◀ Philips Key 019

A design marvel

An award winner at the Consumer Electronics Show (CES) 2004 held at Las Vegas, the wearable Key 019 from Philips is probably the smallest camcorder around. You get 80 minutes of video using MPEG-4, or 25 minutes in Quarter Video Graphics Array (QVGA) at 30 fps, or 200 two-megapixel images. The device functions as an MP3 player too, with 128 MB of USB storage.

Price: NA



◀◀ Sony Qualia 016

A pricey click

Measuring only 2.7 x 0.66 x 0.94 inches, the Qualia 016 is armed with telephoto and wide angle lenses. It eliminates blur by combining four successively shot pictures into one image! 4X digital zoom, and 2 megapixels at a resolution of 1,600 x 1,200 are just more features to drool over.

Price: US$ 4,780 (approx)

Sony DCR-IP1 MICROMV Handycam Camcorder ▶▶

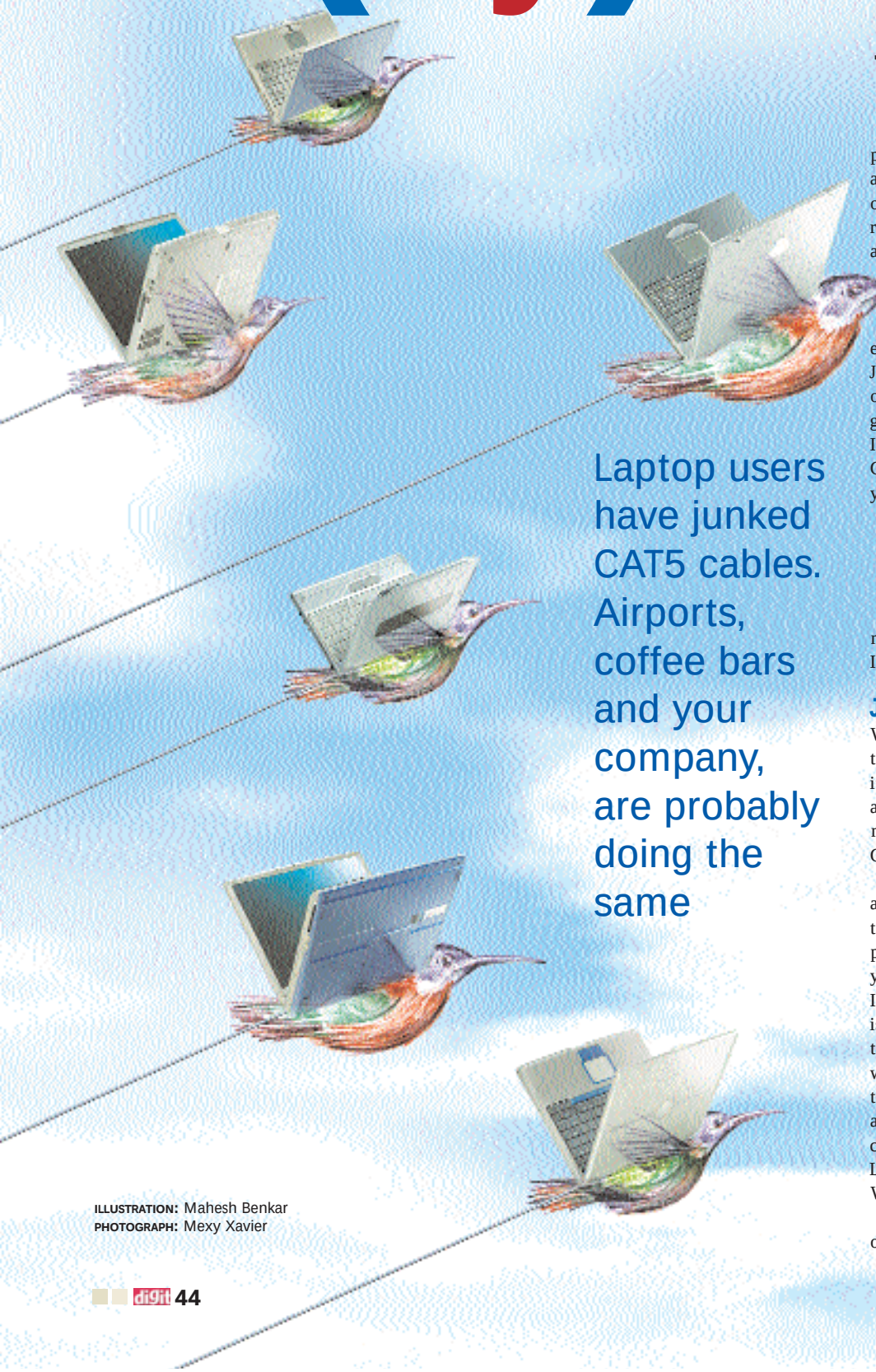
Tape lives!

The lightest of tape-based camcorders, the DCR-IP1 has high-precision digital zoom. It weighs a mere 8 ounces and is about the size of an extended palm. A Hole Accumulation Diode CCD imager with 6,90,000 pixels yields excellent detail, and the MICROMV format delivers digital pictures. Sound quality is comparable to that of MiniDV, but with much smaller tapes.

Price: US$ 1,200 (approx)



W(hy)i-Fi?



Laptop users have junked CAT5 cables. Airports, coffee bars and your company, are probably doing the same

ILLUSTRATION: Mahesh Benkar
PHOTOGRAPH: Mexy Xavier

Wi-Fi, as the IEEE 802.11 wireless networking protocol family is commonly called, is certainly going places. Walk out of an airplane at the Delhi airport, whip open your laptop and get online. Stroll down the leisurely surroundings of Delhi's business class hotels, and stay connected. Pop in for a quick swim at Mumbai's hotels—still connected.

A coffee break isn't an excuse to go offline anymore—Bangalore's Java City range of coffee pubs, and many other popular hangout spots, are only too glad to offer you wireless Internet access. Chances are that your company might be considering Wi-Fi too.

The need of a burgeoning laptop population to stay connected is making much of corporate India look at this wireless option.

Junk the wires, suits

Wi-Fi stands for Wireless Fidelity, and it's the promise of wireless access that makes it sound so attractive. Wi-Fi setups within a corporate environment make you truly mobile, and you don't have to connect a CAT5 cable to your laptop.

Ask Exel India Assistant General Manager, IT, Suresh Subramaniam, who wants to get the large laptop base within his company networked without wires over this year. Or talk to Anil Shankar, Team Leader, Information Systems, Shoppers' Stop, who is all excited about it. Pathways International School, Delhi, also has a Wi-Fi network running on campus. The hotspots at the Delhi and Chennai airports, and those at Bangalore's hangout joints and cyber cafés, are courtesy Sify. Suburban Mumbai's Le Royal Meridien (LRM) hotel also has a Wi-Fi network in place for its guests.

The advantages over wired LANs are obvious. Once the access points (APs) are

wired up, just prop the laptop at an appropriate place and power it up to access the network. You can work from where you get a spot to sit! The corporates we spoke to were impressed by this, and considered their business requirements that demanded access to the LAN and the Internet at all possible places.

It's not that expensive either—with laptop prices crashing and Wi-Fi hardware becoming affordable, implementation costs have reduced drastically.



How they did it

LRM got Convergent Communications, a systems integrator, to set the network up. Both, Harish Chandra, Area Information Systems Manager, LRM, and Rajiv Giri, Deputy General Manager, Convergent Communications have an interesting anecdote. "We charged in the same time as the housekeeping people, and stayed there as long they did!", says Giri. He goes on to say, "It's not difficult to set up a Wi-Fi network, but doing that without tearing apart the furnishings, while the hotel is running with guests all over, was quite a challenge!"

Other problems also cropped up. "The window panes at LRM have a metallic coating to reflect sunlight and so, signals kept dropping when connecting to an AP located on the other side of the glass", says Giri. Convergent worked around this by using more access points.

Chandra recounts, "We couldn't give them the run of the place, and the guests couldn't have the sound of drills and hammers disturbing them, so it was done very discreetly".

Discreet is the word here—if you walk around LRM looking at the decorated walls, you can't see any APs. The only ones you can, are those kept in the open near the poolside.

Setting up a WLAN in other environments isn't that troublesome, since most of the cabling exists due to wired LANs. When asked about any installation problems, Prashant Jain, Director, Pathways International School said that they weren't any. He says that they tied up with IBM Global Services for the network's design and implementation. Shoppers' Stop implemented their WLAN alongside their existing LAN.

Anand Mehta, Marketing Manager, D-Link India, says that initially, APs gave them a less-than optimal throughput when they set up their WLANs in 2001. Mehta says, "During the first few days, users were unhappy with the range." However, the techs quickly figured out that raising the height of the AP to seven ft solved the problem. They then recalculated the optimal number of APs on each floor. Today, the users are more than satisfied and their head office, and several other branches are Wi-Fi enabled.



HARISH CHANDRA, Area Information Systems Manager, Le Royal Meridien, Mumbai

> "We have had a **lot more** customers, **ever since** we started offering **Wi-Fi** connectivity to our guests"

"Setting up Wi-Fi networks," says Giri, "starts with a full-scale site survey, where the entire structure and environment are studied, after which we design and implement the solution".

The people we spoke to pointed out that the actual network setup, including locating an ideal site for the APs was a breeze—just walk around with laptops, check signal strengths from different locations and then fix upon a good location.

Getting the associated infrastructure in place was, of course, dependant on whether the office already had it. If it didn't, it meant additional work.

In terms of hardware, laptops need an add-on Wi-Fi PCMCIA card, while desktops need a PCI Wi-Fi card. Centrino laptops come with inbuilt Wi-Fi networking capabilities. The existing infrastructure in most corporate environments makes it easier to add the cabling needed to connect APs.

Sify Chief Communication Officer, David Appasamy, says that while putting up hotspots at key locations in Bangalore, they used the infrastructure existing in iWay cyber cafés that were connected to their nationwide wired backbone. Direct line-of-

Secure Those Radio Waves

Security is a big issue. Both D-Link and Cisco—networking giants—have underscored the need to secure corporate wireless networks.

D-Link's Shridhar Kadam points out that since radio waves reach out everywhere, and travel through ceilings, floors and walls, "Without stringent security in place, installing a WLAN is the equivalent of putting up Ethernet ports everywhere". Both, D-Link and Cisco agree that the relatively static encryption keys of Wireless Equivalent Privacy (WEP) are not that secure, and urge using Wi-Fi Protected Access (WPA) for corporate networks.

Cisco's Devendra Kamtekar says that it's possible to secure a Wi-Fi network with WPA. There's also the emerging WPA2 standard that's expected to give still better security.

Appasamy talks of 'sophisticated security practices' being used for the company's hotspots. He says that accessing the hotspot, and getting online through Sify will be possible only through a stringent user-authentication procedure.

Isolating the wired and wireless networks, based on the requirement, may also help. In LRM, Chandra and Giri worked out the network in such a way that the wired internal staff network is totally isolated from the WLAN used by guests.

Pathways hasn't had any such security incidents, and Jain quips, "Until now, we have been fortunate!"

sight isn't necessary, and an AP should give you access up to 60-100 metres. Mehta affirms that, "Placement of the access point is critical… The thing to keep in mind is less obstruction and greater coverage area".

Typically, as the signal strength drops, so does the throughput, which is a rudimentary way of finding out what sort of 'spread' an AP has.

To a certain extent, government regulations have played their part in easing the transition to Wi-Fi. Currently, within a building or closed environment, a WLAN is de-licensed on the 2.4 GHz frequency spectrum. As far as IEEE networking standards go, the Indian government's Wireless Planning Commission (WPC) has permitted unlicensed usage of the IEEE 802.11b wireless networking protocol that allows for Wi-Fi connectivity at 11 Mbps.

Cisco's Network Consultant, Devendra M Kamtekar, says that the 802.11g standard regulations right now aren't very clear, and users may need clearance or licenses from the WPC for implementing the same—802.11g allows for a throughput of 54 Mbps. Both work on the 2.4 GHz frequency spectrum.

Vendors privately admit that 802.11g implementations within a closed environment are possible. However, before implementing the 802.11g standard, we strongly urge you to check the current regulations regarding this. At this point of time, outdoor usage in public areas requires licenses from the appropriate governing bodies such as the WPC.



ANAND MEHTA, Marketing Manager, D-Link india Ltd

> "The performance may not be the greatest, as compared to a traditional LAN…but **Wi-Fi** will let laptop users get **truly mobile** and **connect without wires**"

What do they think?

With their campus WLAN up and running, the Jains of Pathways are pretty upbeat about it. "The whole school, in a way, becomes a learning centre," says Prashant Jain. Students from standard VI upward carry laptops around the campus and in the classrooms. "Many a time, a thought or an idea comes to a person's mind, but by the time he gets back to the classroom or hostel room, the idea is lost. In a WLAN, this handicap is not at all there." This, as Jain points out, means that an idea is not limited to the classroom. Sify's clientele will agree with him—they can access the Internet within Bangalore's Java City chain of coffee bars, or the Casa Picola restaurant chain, or at any of the locations provided with hotspots.

Whether it's a chat with the boss as you sip coffee, or checking mail while snacking, wireless connectivity, in Appasamy's words, "Lets you get the job done, and get on with it". Their clientele is primarily drawn from business travellers who enter the city with Wi-Fi enabled laptops. Such globe-trotters love staying connected, and in IT-savvy Bangalore, Sify helps them do so by signing up with its service, right from the airport itself. Besides the good subscriber feedback, Appasamy goes on to state that Sify often gets enquiries from customers abroad who want to subscribe to the service before they even arrive in Bangalore.

Business travellers are also big Wi-Fi customers for LRM. Chandra says, "With 90 per cent of our business travellers wanting to stay connected, we have had more corporates booking the business centre, since there's wireless connectivity all over".

Wi-Fi certainly holds good for the retail segment as well. At Shoppers' Stop, Andheri, a Mumbai suburb, Anil Shankar says that with their Wi-Fi setup in place, they can change the store layout and decor, without having to worry about the networking infrastructure.

Problems… or are they?

Configuring the individual network nodes is pretty simple—in Windows, for instance, it's a matter of making the necessary changes in the network settings. Jain says that at Pathways, "The in-house systems administrator does this 2-minute job."

Service outages are an issue, though the people we spoke to didn't seem to be wrestling with too many of them. Chandra says, "LRM has yet to suffer any outages or network congestion." At present, their 11 Mbps Wi-Fi network is connected via a 512 Kbps pipe to their ISP. They were lucky—even the Blaster attack didn't clog their network. "We got the alert from the ISP," say Chandra and Giri, "and immediately contacted those with infected laptops". Their 24/7 technical support

Around the World in a Wi-Fi

Wi-Fi networks have risen from IEEE networking standards. The 802.11 IEEE covers the wireless networking standard. Commercial wireless access points were promoted in early 1995.

Wayport, a pioneering organisation in the Wi-Fi space, based in Austin, Texas, set up wireless networks in early 1997. The same year also saw the IEEE 802.11 standards being finalised.

Back in 1999, Apple offered Wi-Fi support along with the necessary hardware. 2001 saw the emergence of many companies that worked on public Wi-Fi, but several have since disappeared. In October 2002, the emergence of WPA, which has now replaced WEP, ensured better security.

Intel worked on the Banias CPU architecture that led to the development of the Centrino platform in 2003. This platform works with a Pentium M CPU, the 855 chipset family, and a wireless network adapter that conforms to the 802.11b standard.

In the US, public Wi-Fi access has boomed. Starbucks, the coffee chain offers Wi-Fi services, as does McDonald's. Internationally, college campuses, hotels, airports and bookstores, such as the Barnes and Noble bookstore chain, are getting Wi-Fi enabled as well. There's a large laptop population in the student and white-collar community who actively use these services, both for work as well as leisure.

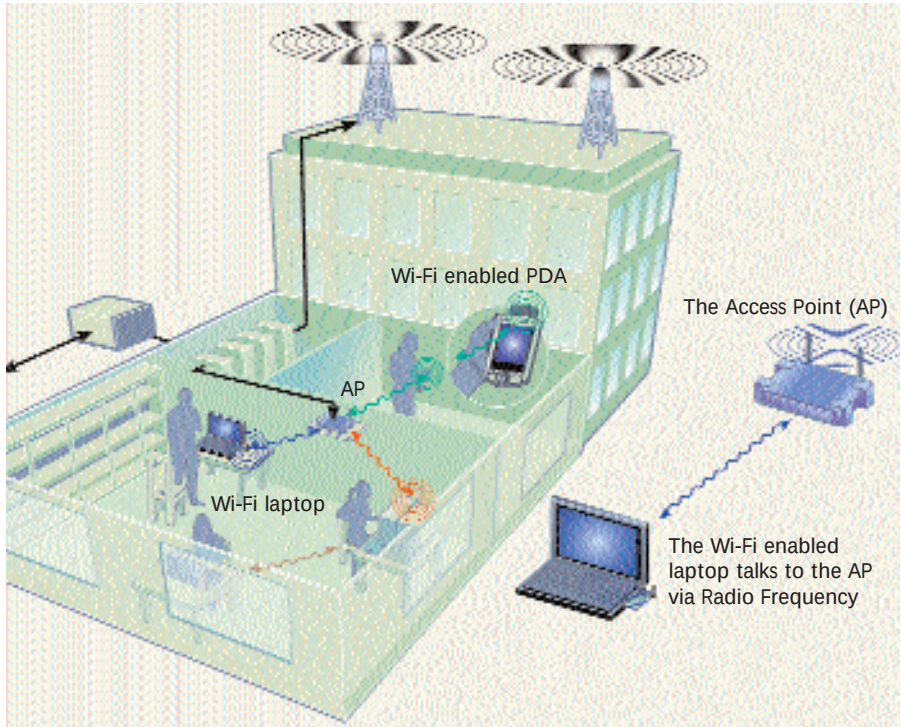
instantly provided the necessary fixes. Giri says, "A service outage could mean a faulty AP, or problems in the wired infrastructure, or lack of connectivity at the ISP's end."

Convergent's technical team checks the LRM APs on a daily basis for all quality-of-service parameters, and confirms that the bandwidth available is upto the mark. Pathways didn't have any major service outages either. In Jain's words, their network is up, "working fine, without any congestion".

Maintenance, too, is not a problem per se. Jain says that their in-house tech staff, though "not experts", can easily field small problems. Shankar points out, "Wi-Fi is new technology around here, and everyone is eager to push it. Still, for a really crowded network, the 11 Mbps throughput may not be quite adequate, and never as good as a wired LAN".

Wired LANs still give you higher throughput than a Wi-Fi LAN. The maximum speeds on a wired network are 100 Mbps, and 11 Mbps for a 802.11b Wi-Fi. In practice, wired LANs give about 50-60 Mbps and about 5-6 Mbps is considered fine for Wi-Fi networks. While normal Internet access isn't really affected by this, heavy LAN usage, such as accessing large files on the LAN, will be noticeably slower on a Wi-Fi network.

D-Link's General Manager for Development and Product Support, Shridhar Kadam lists the reliability and reach of WLANs as important parameters that make them popular, and goes on to say that with both wired and wireless LAN generally co-existing within the same environment, its important to ensure that the two are compatible and manageable as one network.



Cost per PC for setting up a wired and a wireless office LAN

WIRED		WIRELESS	
1 10/100 Mbps LAN card	Rs 500	1 PCMCIA Wi-Fi card	Rs 2,800
CAT5 cable 20m length	Rs 200	1/20th access point	Rs 250
1/24th Patch Panel port, information outlets, & other hardware	Rs 200		
GRAND TOTAL:	**Rs 900**		**Rs 3,050**

The cost of switches will be common to both; wireless LAN will be a 11/22 Mbps (using standard 802.11b or proprietary 802.11b+ technology). The wired LAN will have a 100 Mbps throughput.

All costs are approximate

Jargon Buster

802.11 standards: The 'b' standard came first, operating on the 2.4 GHz spectrum, offering 11 Mbps throughput. Next up was 802.11a that operated at 5 GHz, with a 54 Mbps speed. This was quickly superseded by the 802.11g that operates on the 2.4 GHz band and gives 54 Mbps.

Access points: Wi-Fi enabled desktops and laptops communicate via radio frequency with the Access Point (AP). The AP then connects to the backend servers that provide the necessary infrastructure to connect to the Internet.

WPA: Wi-Fi Protected Access, a security protocol suite that has replaced WEP, using a complex, and until now, secure system of authentication.

WEP: Wireless Equivalent Privacy, an older security protocol that was used widely in older APs, to provide security. WEP is now considered relatively insecure.

How far would they go

So impressed was Jain with the Wi-Fi network at the Pathways campus, that he implemented one at home. Exel's Subramaniam says that eventually, he wants to get entire new offices go to Wi-Fi. "It's not tough to set it up", is the common refrain. As of now, Wi-Fi adoption in India is driven by corporate adoption and the recent fall in laptop prices. Typically, laptop users are those in higher management and well, you do need to be that highly placed to shell out Rs 70,000 to buy a decent laptop!

Undoubtedly, Wi-Fi networks are going to spread within a few years, and will probably be commonplace within the next five years. As hardware costs keep coming down, expect more activity on the wireless front. While Wi-Fi will never replace conventional wired access, it will provide access at places where we couldn't get connected earlier.

Don't bet too much on getting cheap public hotspot access, though. Sify charges about Rs 515 for 8 hours of Wi-Fi connectivity in Bangalore.

Appasamy says very matter-of-factly, that unlike in the US, "The average Joe who walks into a coffee bar is not going to carry a laptop", indicating that wire-free Internet access is still going to be firmly targeted at the individuals who are willing to pay, for it. At LRM, they discreetly tell us that guests are charged Rs 500 for 24 hours of access, or Rs 250 for every hour of connectivity.

Nevertheless, the luxury of sitting by the sunny poolside, sipping chilled water and surfing the Internet makes it look reasonable. Almost!

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How we Test

It looks good and the technology is glitzy, but does it do the job?

To ensure that our readers have all the information they need to make an informed buying decision, reviewers at the Digit Test Centre conduct comprehensive tests to evaluate the latest hardware, software and technology services in accordance with international standard evaluation processes and methodologies.

Our test results may be presented either as Comparison Tests, or as individual reviews in the Bazaar section. The representation of the results is different for each in the interests of clarity, but the test process for both is identical in all respects.

Of all the products we test, only the best make it to the A-List.

Comparison Tests

In the comparison tests, we compare the performance of products within a particular category. Each product is evaluated under different parameters such as performance, value for money, features, ergonomics, etc.

Weightages are then applied to the various test parameters according to their importance for that particular category of products. These weightages are then used to arrive at scores for features, ergonomics and performance for each individual product. A detailed test process is included with each comparison test, and explains the parameters that were taken into consideration, along with weightage allocation and reasons for the same.

In Bazaar

The evaluation of products in Bazaar also covers the same parameters such as performance, ease of use, value for money, build quality and features of the product.

Here, each of these parameters is rated on a scale of 5, which is represented by arrows (->).

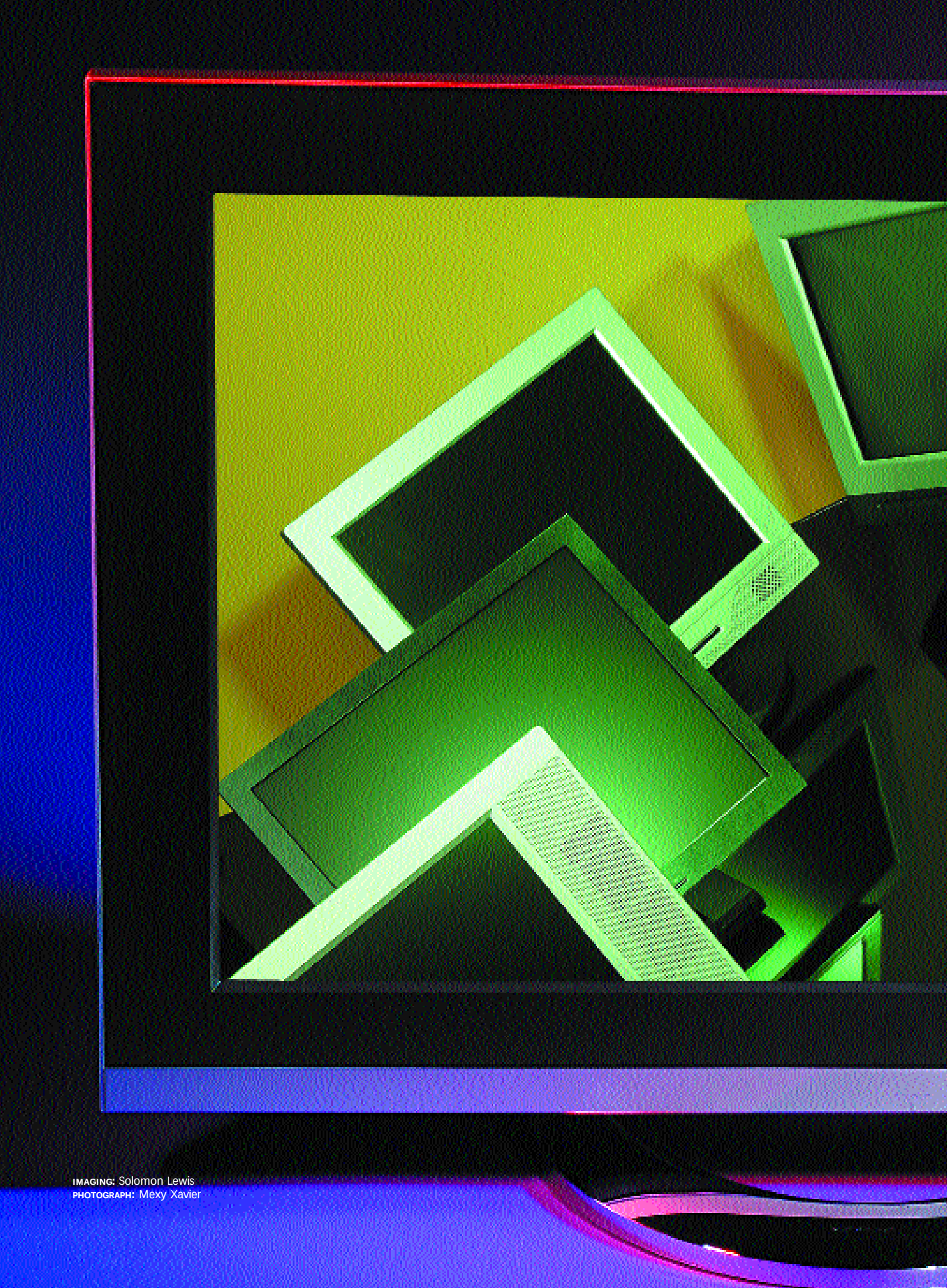
The greater the number of arrows, the better the product. This simple five-point rating system is designed to give you an easy-to-interpret assessment of a product. For example, a product that receives a value for money score of five arrows signifies an outstanding buy.



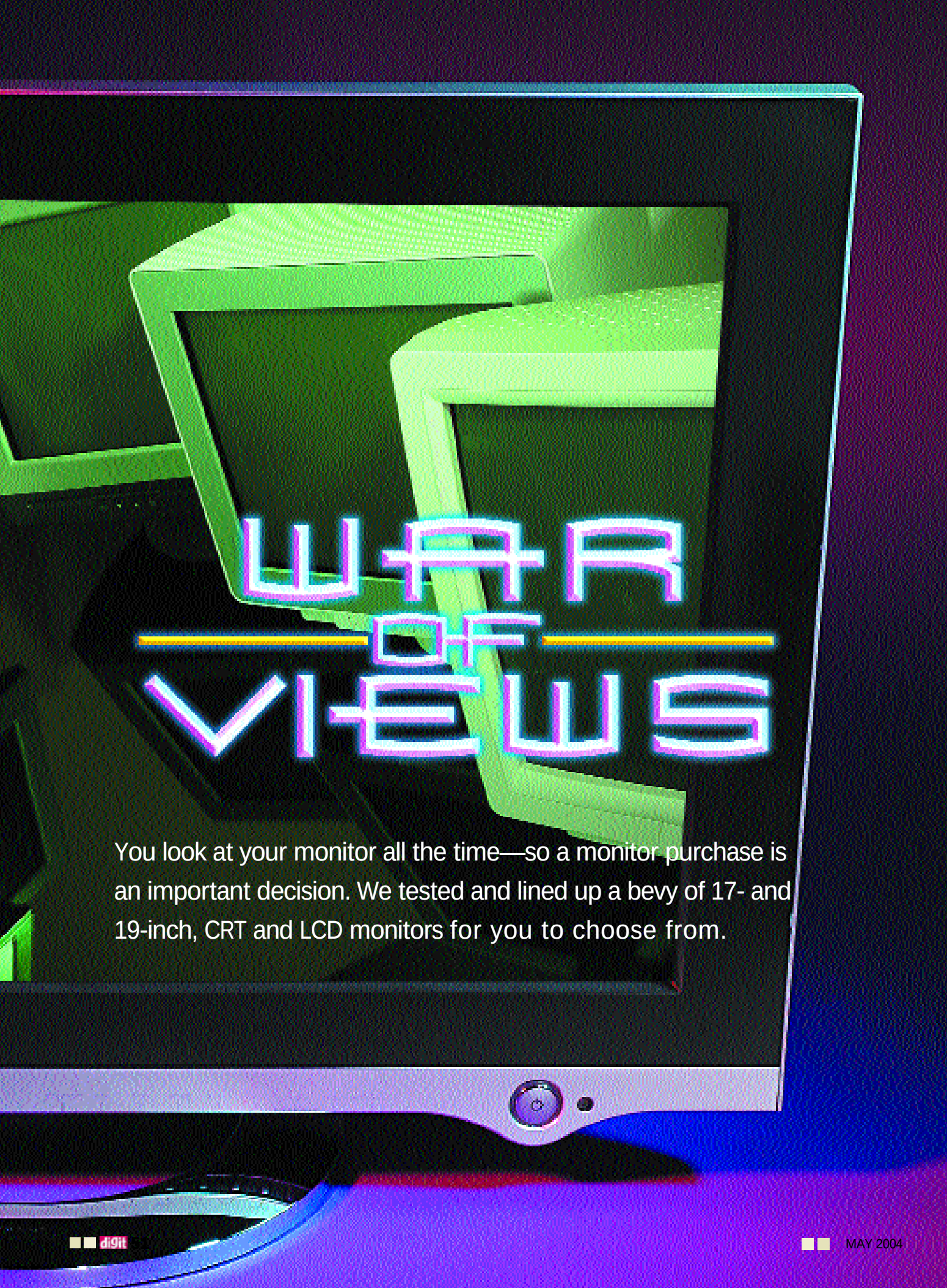
The Awards

Digit awards outstanding products by selecting a Best Performance and Best Value winner in each comparison test. The winner of the Best Performance Award will be the product that scored the highest in the performance segment combined with rest of the package including features, ergonomics, bundled accessories etc. This award represents the best performing product in our tests in terms of the complete package that is offered to a customer. The winner of the Best Value Award will be the product that scores the highest in our value for money parameter which is derived taking into account the ratio of a product's ergonomics, performance and features to its price. The product winning this award offers a good combination of performance and features at a great price. Since value for money takes into account all scores for all parameters including the price, this score will be used to arrive at a grade (e.g. A+) for each product.

The 5-point Rating System used in Bazaar	
▸▸▸▸▸	**Excellent:** A brilliant combination of price, performance and features—far beyond expectations
▸▸▸▸▸	**Good:** A good buy, better than most products in its category
▸▸▸▸▸	**Average:** Reasonably competent but nothing spectacular about the product
▸▸▸▸▸	**Mediocre:** Does not live up to expectations, needs improvement in many areas
▸▸▸▸▸	**Poor:** has serious drawbacks and needs improvement before it can be used for its target application



IMAGING: Solomon Lewis
PHOTOGRAPH: Mexy Xavier



WAR OF VIEWS

You look at your monitor all the time—so a monitor purchase is an important decision. We tested and lined up a bevy of 17- and 19-inch, CRT and LCD monitors for you to choose from.

17-inch CRT Monitors

Fifteeen-inchers are a thing of the past; the new monitor's minimum starts at 17 inches, thanks to the fall in hardware prices. To go a-monitor shopping, all you need is a little research, some market-browsing and the information you get from the comparison tests that follow.

Features

We had quite a few competitors in the 17-inch category—16 to be precise. The major categorisation here is regular monitors and flat-screen monitors. Flat-screen monitors come in two flavours—Aperture Grille and Shadow Mask. Generally, most of the monitors we use have a picture tube based on Shadow Mask technology. Aperture Grille is a special technology, invented by Sony, and affords greater resolution and clarity.



None of the monitors we received featured integrated speakers. The NEC Multisync FE791SB and the Samsung 763MB had a special brightness control feature, which adjusts brightness when viewing different types of content: there are preset modes for Internet, text and movie viewing.

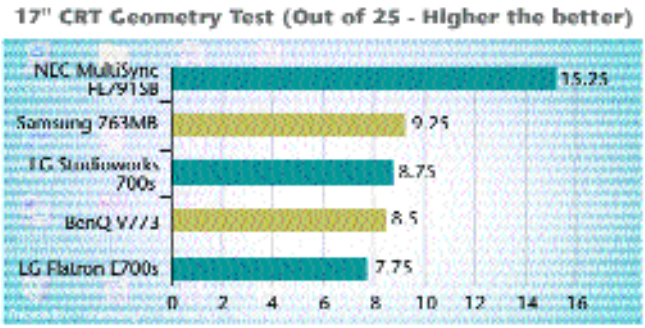
All the monitors we received have Shadow Mask picture tubes, except for the NEC Multisync FE791SB, which has an Aperture Grille tube. The video bandwidth of this monitor, at 145.92 MHz, was the highest amongst all the monitors in the 17-inch category. The NEC monitor also affords the highest resolution, and goes as high as 1,600 x 1,200 at 76 Hz—equivalent to the highest resolutions available on several 19-inch monitors.

Flicker-free viewing is one of the best things about the NEC—the reduction in flicker is because of high refresh rates. The next-best monitors in terms of video bandwidth and features were the LG Flatron E700S and the Samsung 763MB.

Dot pitch is very important when you're considering purchasing a CRT monitor: the smaller the dot pitch, the sharper the image, which translates to improved overall picture quality. The diagonal dot pitch of the NEC is 0.25 mm; however, the Samsung is the best of the lot, with a diagonal dot pitch of 0.23 mm.

Other monitors were run-of-the-mill, with virtually no difference in specifications. It's clear from the features listings that flat-screen monitors have an edge over regular monitors, with their higher video bandwidth and refresh rates, not to mention the flatness of screen.

Features-wise, the NEC beat the other monitors hands down, but the real tussle was in the performance tests.



Performance

All the monitors we received had OSD (On Screen Display) controls, and we assigned higher scores to those that were user-friendly. The Microtek monitor was particularly so—it has an intuitive interface, with just one knob for all monitor functions. The LG and the Samsung were the other monitors that had very easy-to-use OSD controls. Although the NEC is packed with features, the OSD controls take time to get used to.

Geometry tests were performed to check for monitor symmetry after all adjustments were done. The NEC MultiSync FE791SB was the best of the lot, and scored the highest in the geometry tests. Pincushion distortion is more evident in flat-screen monitors, so the NEC lost out here; however, in the screen regulation tests, it did well.

The NEC monitor seemed to keep its cool where the other monitors were jumpy. A series of 'regulation tests' guage the monitor using different simulated situations. These are impor-

NEC MultiSync 791SB

BEST PERFORMANCE digit MAY 2004

The performance winner in this category was hard to beat. Flat screen monitors are better than regular CRTs, and our test results just reinforced the fact.



The NEC MultiSync FE791SB was the only 17-inch monitor in our tests to feature an Aperture Grille CRT. And the advantages are clearly visible. Flicker-free viewing at high resolutions give it a more than enough edge over the other monitors. The diagonal dot pitch of the NEC monitor is also less than 0.26 mm, which, combined with the refresh rates and resolutions, will definitely give you a crisper picture.

The OSD controls could have been more user-friendly, though. The NEC MultiSync FE791SB retails for Rs 16,500, which is way higher than the retail price of any other 17-inch CRT we tested. But quality demands a price, and if you're finicky and won't compromise, you can't go wrong with this monitor.

+ Aperture Grille, flicker-free viewing
– OSD controls not intuitive
Price: Rs 16,500

LG 2320A 23-inch Widescreen Monitor



This monitor looks like a preview of the future. Its humongous 23-inch widescreen offers an unforgettable viewing experience. You'll never have to scroll through Excel sheets or long Web pages again.

The monitor comes with an external control box, with almost all possible connectivity options on the back panel. There's also an option for speakers on this monitor. The cables provided include a SCART cable, S-Video cable, USB cable and a regular DVI-D/15-pin D-Sub cable. You also get a full-fledged remote, with enough controls to confuse you initially. One of the available modes is the Spectacle function: this mode sets a varied aspect ratio—the central area has an aspect ratio close to 4:3, and the edges exceed 16:9.

The monitor also has the PIP function, which allows you to view a screen within a screen, but lacks an in-built TV tuner. Get yourself an anamorphic 16:9 widescreen DVD to play, pop some corn, get your favourite chair, dim the lights and you'll be convinced you're sitting in a theatre.

If you can afford it, this beauty is a must-have.

+ Wide variety of connectivity options
– No in-built TV tuner
Price: Rs 1,85,000

tant, because the first thing you need to get right is the display on the monitor. The factory settings of all monitors are not the same, and setting a monitor properly and symmetrically is the first thing that needs to be done. Curved screen edges or unsymmetrical sides are irritating. Any monitor that does this to an acceptable level, even after adjustment, is okay, but if this happens too much, you need to look further. The Microtek, for example, was bad as far as curved edges etc. are concerned.

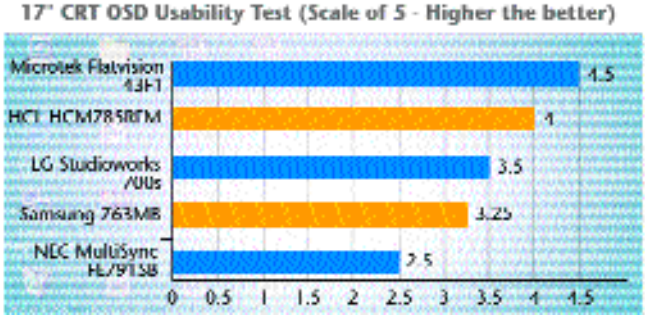
The next series of tests involved testing the sharpness and resolution. Images shot at a particular resolution are displayed with the same clarity on a monitor only at the same resolution. If the resolution is changed, the images tend to be distorted and blocky; but this happens to a minimal extent on a good monitor. This effect is more evident with CRT monitors than flat-screen ones, and this is the point that manufacturers make when they advertise flat-screen monitors. Surprisingly, it turns out that all images we currently see at 640 x 480, are at the best resolution they can be. Going above that resolution, even the best monitors have difficulties reproducing the image—they lose out on the finer details.

The above-mentioned tests test precisely this, by running an image in coarse, fine and diagonal patterns. The fine images were more blurred than the regular image.

The results of this test are important for people who are into visual work such as CAD, CAM or DTP, since they need to work with images all the time. For such users, a flat-screen monitor is best. The LGE700H and the Philips 107C5 are both flat-screen monitors that put up the best scores, beating the NEC, while the HCL HCM785RFM scored the lowest. All the other monitors, including the Samsung and the BenQ, gave above-average scores.

We also conducted colour and greyscale tests on the monitors. You can make out when colours have a more pronounced

17" CRT OSD Usability Test (Scale of 5 - Higher the better)



Philips 107E5

This is a wonderful package, and maintains a good balance between features and performance, without being heavy on the pocket.



The Philips 107E5 is a flat-screen monitor, and even with its great features and performance, is one of the lowest priced monitors in this category. The diagonal dot pitch is 0.25 mm, and the highest resolution supported is 1280 x 1024 at 60 Hz. Compared to other monitors in the same price range, the monitor is flicker-free and the display is good. In fact, this monitor scored very well in the colour and greyscale tests, leaving the big guns behind. Features-wise, it packs in almost everything. However, the OSD controls, again, could have been more intuitive.

+ Low-priced, flicker-free viewing
– OSD controls not very intuitive
Price: Rs 6,300



How We Tested

Our test-bed comprised an Intel Pentium 4 3 GHz processor, running on an Intel D875PBZ motherboard, with 512 MB of DDR 333 RAM, a Seagate Barracuda 120 GB SATA hard drive and an Ennyah GeForce FX 5700 graphics card.

All the monitors were tested for performance and features. The features and performance parameters are allotted 40 per cent and 60 per cent respectively. The performance and features scores were added, and the sum was divided by cost. This gave us an index for value for money.

Performance: We used the DisplayMate benchmarking software to gauge performance. It uses images to test for geometrical accuracy. This aspect is especially important for CAD and CAM designers, and users of graphics applications.

Another important factor to consider is the ability of the monitor to hold image shape in a stable manner. Sudden changes in brightness levels can cause distortion, say, when you toggle between an application and the desktop.

In the sharpness and resolution set of tests, we tested the image sharpness offered by the monitor and the resolution at which it displays pictures clearly. The Defocusing, Blooming and Halos tests showed us how much thicker an image looks compared to its darker counterpart: in this test, the image detail projected by the CRT is measured.

The pixel persistence test was run specifically for the LCDs, to check for jerks or image blurring. Another LCD-specific test was the viewable angle test. Unlike CRT monitors, when you view an LCD screen from an angle, things are not as bright and clear. We tested to find the angles at which the screen still looked crisp.

Features: We looked for value-additions and other aspects that aimed at increasing the user-friendliness of the display. The features noted varied in their significance—from simple things such as ease of use of the OSD, to power consumption for LCDs, and depth and weight for CRTs.

We also looked for, and awarded points to, important parameters such as pixel size and video bandwidth, in both LCD and CRT monitors. A smaller pixel size and higher video bandwidth was given preference, as it helps to make the display crisper and the colours more vivid.

Even the monitor bases were tested, to see how much they could be tilted—the more the better.

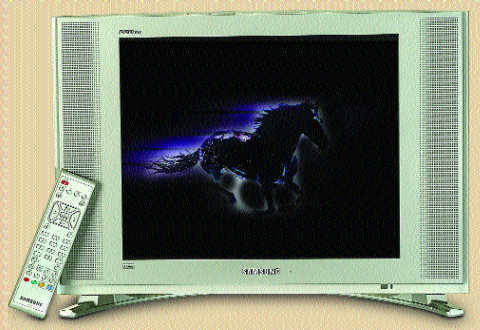
Wall-mounted LCDs are convenient, and earned more points. Height adjustment was also considered. Interestingly, some could be rotated from landscape to portrait mode.

User manuals are often overlooked, as is the quick start guide. We pored through them to see how helpful they'd be if we didn't already know how to set up a monitor.



CATEGORY		CRT MONITORS 17"							
	Brand	BenQ	BenQ	HCL	HCL	LG	LG	LG	Microtek
	Model	G775	V773	HCM780M	HCM785RFM	Flatron E700BH	Flatron E700s	Studioworks 700S	Flatvision 43F1
FEATURES (40%)	Size (Inches)	17	17	17	17	17	17	17	17
	Viewable Area (Inches)	16	16	16	16	16	16	16	16
	F&FST (Y/N)	Y	N	N	Y	Y	Y	N	N
	Dot Pitch (mm) (Diagonal)	0.25	0.27	0.27	0.21 (horizontal)	0.25	0.25	0.23 (horizontal)	0.28
	Vertical Scan Rate (Hz)	50 - 120	50 - 120	50 - 160	50 - 160	50 - 160	51 - 160	50 - 160	50 - 120
	Horizontal Scan Rate (KHz)	30 - 72	30 - 72	30 - 70	30 - 72	30 - 71	31 - 71	30 - 70	30 - 70
	Maximum Resolution/Refresh Rate (Hz)	1280 x 1024 @ 60	1280 x 1024 @ 67	1280 x 1024 @ 60	1280 x 1024 @ 60	1280 x 1024 @ 60	1280 x 1024 @ 60	1280 x1024 @ 60	1280 x 1024 @ 60
	Video Bandwidth (MHz)	110	110	110	110	110	110	NA	110
	CRT type	ShadowMask	ShadowMask	ShadowMask	ShadowMask	ShadowMask	ShadowMask	ShadowMask	ShadowMask
	W x H x D (mm)	406 x 422 x 417.5	406 x 422 x 412.5	410 x 402 x 420	410 x 402 x 420	400 x 395 x 424	401 x 395 x 424	400 x 420 x 395	406 x 404 x 423
	Weight (Kg)	16.4	15.4	15.5	16	16	16	14.4	15.5
	In-built Speakers (Y/N)	N	N	N	N	N	N	N	N
	Anti-Glare Coating (Y/N)	Y	N	Y	Y	Y	Y	Y	Y
	Bundled Accessories (Manuals, Colour Profile, Driver and Calibrating software, etc.)	User manual, driver CD	User manual, driver CD	User manual	User manual	User manual, driver CD	User manual, driver CD	User manual, Driver CD	User manual
PERFORMANCE (60%)	Performance								
	OSD Usability (scale of 5)	3.25	3.5	3.75	4	3.5	3.5	3.5	4.5
	DisplayMate Tests								
	Geometry test (scale of 25)	6.5	8.5	5.25	4.25	6.5	7.75	8.75	4
	Sharpness and Resolution (scale of 35)	23	22.5	17	22.5	24.5	23.5	22.25	20.75
	Screen Pixel Resolution (scale of 5)	3.5	3.75	2.75	3.5	3.75	3.75	3.75	3.25
	Colour and Grey Scale (scale of 45)	34	30	29	28.5	28	31.5	30.25	30.5
	Miscellaneous Effects (scale of 25)	15.25	15.5	16.75	16	15	16.25	16.75	16
OVERALL SCORE	Features	17	10	14	19	21	21	15	11
	Performance	34.25	33.85	29.5	31	32.4	34.7	34.45	31.65
	Overall (Features + Performance)	51.25	43.85	43.5	50	53.4	55.7	49.45	42.65
	Value for Money	2.26	2.53	2.67	2.39	2.25	2.49	2.81	2.81
	Price	8,500	6,500	6,100	7,850	8,900	8,400	6,600	5,700
	Grade	B-	B-	B-	B-	B-	B-	B-	B-

Samsung LS17E34C



The Samsung LS17E34C was one of the first to offer a widescreen hybrid LCD-cum-TV. This device can serve as your PC monitor when you're working, and as an entertainment centre when you're not. With a glossy metallic colour, it definitely adds aesthetic appeal to any living room. Gaming on a widescreen LCD monitor can be a bit irritating, however, because the games tend to look stretched.

Watching a DVD movie on a wide-screen monitor is a pleasure, and the Samsung LS17E34C didn't give us any cause for complaint. It has a special surround sound mode called Virtual Dolby Surround, which adds to the movie experience. The monitor can be connected directly to a stand-alone DVD player, and comes with a remote control which can control all the functions of the monitor. It also has an in-built TV tuner—all you need to do is plug in the cable and scan through channels.

The PIP (picture-in-picture) is another handy function—you can work with an Excel sheet and catch up with the latest news simultaneously. Imagine how useful this could be for share-brokers: they could check the latest share prices on CNBC and trade shares on Web sites at the same time.

+Feature rich
– Display quality not up to the mark
Price: Rs 74,990

effect, such as in bleeding, where the colour seems to go over the border or frame of a photograph. Over all monitors, there's a definite variance in hue and tone. We also tested for streaking and ghosting—generally, this happens with images that have solid elements, such as geometrical shapes, or Windows that are tiled one on the other. The lesser this effect, the better the monitor. In these tests, the Philips 107C5 led the pack, followed closely by the Samsung 563MB.

The last batch of tests checked for screen uniformity. There were also miscellaneous tests that looked at other aspects of the monitors. As expected, the NEC MultiSync FE791SB won on these tests.

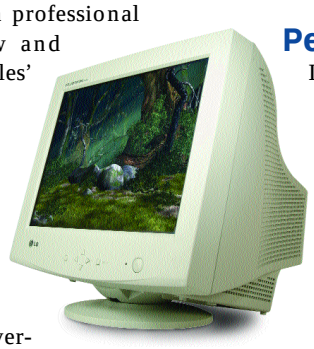




NEC MultiSync FE770	NEC MultiSync FE791SB	Philips 107C5	Philips 107E5	Samsung 763MB	Samsung 773DFx	Samsung 773s	Viewsonic E70f
17	17	17	17	17	17	17	17
16	16	15.9	16	16	16	16	16
Y	Y	Y	N	Y	Y	N	Yes
0.21 - 0.25	0.25	0.25	0.27	0.20 (horizontal)	0.20 (horizontal)	0.23 (horizontal)	0.25
50 - 120	50 - 160	50-160	50 - 160	50 - 160	50 - 160	50 - 160	50-120
30 - 70	30 - 96	30-71	30 - 70	30 - 70	30 - 70	30 - 70	30-70
1280 X 1024 @ 66	1600 X 1200 @ 76	1280 X 1024 @ 60	1280 x 1024 @ 60	1280 x 1024 @ 60	1280 x 1024 @ 65	1280 x 1024 @60	1280 x 1024 @ 66
NA	NA	NA	NA	110	110	110	120
ShadowMask	Aperture Grille	ShadowMask	ShadowMask	ShadowMask	ShadowMask	ShadowMask	ShadowMask
397 x 392 x 415.5	397 x 392 x 415.5	397 x 383 x 424	397 x 333 x 419	398 x 412 x 400	398 x 412 x 400	398 x 412 x 400	410 x 406 x 424
16	17.2	15.5	14.5	16	15.9	16	17.5
N	N	N	N	N	N	N	N
Y	Y	Y	Y	Y	Y	Y	Y
User manual, colour profile software, driver, calibrating software	User manual, colour profile software, driver, calibrating software	User manual, colour profile software, driver	User manual, colour profile software, driver, calibrating software	User manual, colour profile software, driver	User manual, colour profile software, driver	User manual, driver CD	User manual, Colour profile software, Driver, Calibrating software
2.25	2.5	2.75	2.75	3.25	3.5	4	3.25
7.25	15.25	7	5.25	9.25	6.5	7	6.5
19.5	21.5	23.75	21	22.25	23	20.75	19.5
3.5	3	3.25	2.75	4	3.75	3.75	3.5
29	30.5	33.75	28.25	32.5	30.75	28.75	28.5
15.75	18.75	16	16.25	16.25	15.75	15.5	15.5
19	27	14	20	19	19	16	17
31.05	38.35	34.65	30.3	35.5	33.1	32.05	31.15
50.05	65.35	48.65	50.3	54.5	52.1	48.05	48.15
1.63	1.49	2.20	2.99	2.29	2.15	2.20	2.43
11,500	16,500	8,300	6,300	9,500	8,900	7,400	7,900
C	C	B-	B	B-	C+	B-	B-

19-inch CRT Monitors

If 17-inchers are the standard, 19-inchers are prime real estate. Priced just Rs 2,000 or 3,000 more than their 17-inch counterparts, 19-inch monitors are fast becoming popular. In fact, they are a standard with professional users working with Photoshop, Corel Draw and QuarkXPress. Even avid gamers and 'videophiles' have begun opting for them.



Features

The first thing you'll notice about 19-inch CRT monitors is that they have a much higher bandwidth than the 17-inchers. This translates to flicker-free viewing. Also, the resolutions offered are higher.

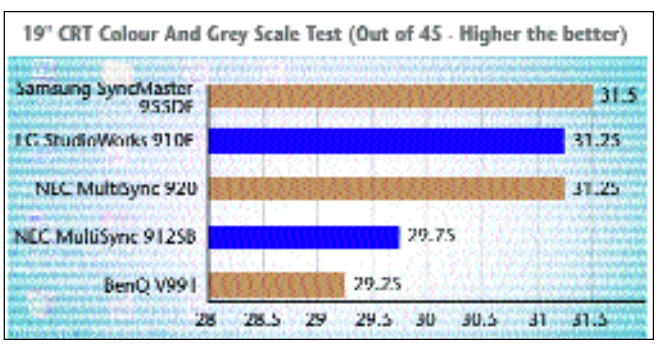
Last year's winner, the BenQ V991, was overshadowed by the slew of models this year. The Philips 109P4 had the best specs amongst all the monitors in both dot pitch and video bandwidth. The maximum resolution achievable by last year's winner was 1,600 x 1,200 pixels at 78 Hz—here Hz is the vertical frequency scan rate of the monitor. This year, that's just average, and both this year's Philips models can attain resolutions of 1,920 x 1,440 pixels at 60 Hz. The NEC Diamondtron can go as high as 1,920 x 1,440 pixels at 73 Hz. The entry level Philips monitors offer a dot pitch of 0.25 mm—something not seen in any of the other entry level monitors.

The biggest drawback of 19-inch monitors is their bulkiness; compactness earned points.

The Philips 109P4 has a flat screen with Aperture Grille technology. The only other monitor to offer this technology is the NEC MultiSync 912SB. Here, SB stands for Smart Bright—preset modes of brightness that you can choose between, according to the applications you're working on, such as 'Net surfing, watching a movie or working on a text file. The Philips 109P4 is the only monitor to feature extra RGB inputs, other than the regular D-Sub 15-pin connector.

The LG StudioWorks 910E was the lightest model, but it suffered in terms of features—it didn't even have a full flat screen. The NEC FP912SB is one huge monitor, and has cumbersome OSD controls. In terms of OSD, the BenQ V991 is easy to use and access, and can be set up in no time.

None of the monitors featured any extras such as USB hubs, which offer an option for external connectivity. Speakers were missing, too. All the monitors came with the standard package of manuals, drivers and warranties along with the necessary cables.



Performance

In our performance tests, we ran the DisplayMate collection of tests. The geometry test was very important for all the 19-inch monitors, since the pincushion and barrel distortion is comparatively less than on a 17-inch monitor. Also, since 19-inch CRTs are more popular amongst professionals, precision is a must—if the geometry of a monitor is incorrect or unsymmetrical, it can cause problems when used with engineering or design applications. The Samsung 955DF fared poorly in the geometry test—there was too much variation in the size and shape of the images in the geometrical resolution tests. Even after adjusting the monitor to give the maximum screen area, the Samsung

Philips 109P4

The battle for the performance title was tight. The NEC MultiSync 912SB was always on the heels of the Philips 109P4, throughout the gruelling tests. The NEC put in a very commendable performance, and deserves special mention, but there's only one spot on the top.



The Philips 109P4 deserves our crown of best performing 19-inch CRT monitor, with features and performance that are second to none. It has an Aperture Grille picture tube, which is FFST and guarantees excellent image quality.

The 109P4 looks great. It's also the only monitor to offer external RGB connectors, and is feature-packed, though more, such as a USB hub would have been welcome.

This monitor zoomed through all our tests. The resolution offered is one of the highest, and colours are sharp and vivid. The contrast is very good, and the monitor is suitable for any application you can think of. The only grudge is the OSD controls, which need some effort to get used to.

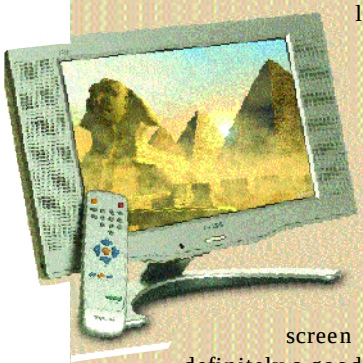
We suggest that you look no further if you want a high-performing monitor at a decent price. Ideal for any desktop!

+ Aperture Grille, looks great
– OSD controls take time to get used to
Price: Rs 18,500

Philips 17-inch W 170T4 Widescreen Multifunctional LCD monitor

Another entrant in the widescreen LCD-TV segment is the Philips 17-inch W 170T4 monitor. It's better than the Samsung in terms of performance as a monitor, as well as in terms of display quality.

A TV tuner is built into the monitor, taking care of your TV viewing needs. This monitor also supports HDTV, so, as and when HDTV is available in India, you'll be prepared. There's a screen mode that lets you switch between standard mode, 4:3 aspect ratio, HD and non-linear scaling mode. Other features include NICAM stereo and a sleep timer, making this device an excellent replacement for your TV.



There are sound controls for everything, including bass, treble and surround sound mode. The monitor gave pretty good results in our DisplayMate battery of tests.

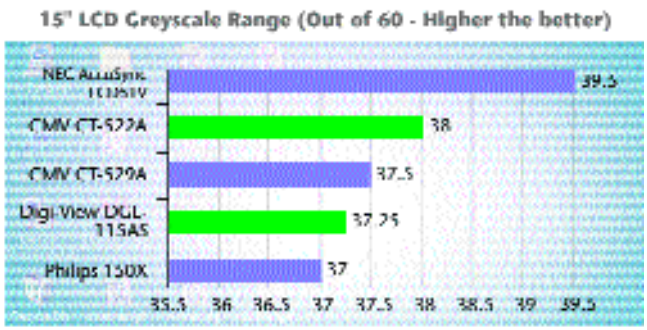
It does its job well, both as a computer LCD and as a TV/Video display device. The Philips 17-inch W 170T4 Widescreen Multifunctional LCD monitor is definitely a good buy, especially if you want your monitor to be future-proof.

+ Good picture quality
– Very few features
Price: Rs 49,999

still disappointed us. Based on the results of this test, it is fair to say that this monitor should not be used for working with CAD, CAM or design applications. The BenQ, however, posted good scores, and was second only to the Philips 109P4.

In our sharpness and resolution tests, the BenQ and the Philips 109P4 duelled right to the end. The BenQ lost to the Philips in the resolution matrix and the fine resolution matrix tests. Though the NEC MultiSync 912SB also posted good results in these tests, it could only manage a close third. The aim of these tests is to check the image sharpness with the least distortion possible, and the Phillips 109P4 proved to be the best of the lot.

One of the most important tests is the colour test. A monitor should display colours correctly with little or no bleeding, and should have proper colour controls. Generally, all monitors have the option to set a higher colour temperature—9500 K (Kelvin)—for programs that need it: as mentioned in *'Jargon Buster'*, lower temperatures are more suitable for viewing images, movies and such, while documents and precise graphic design demand higher temperatures.



The HCL 985RFM was not up to the mark in our colour tests, as colour mixing was prevalent at some places on the screen. Streaking and ghosting were other parts of the tests where the HCL suffered. The Samsung 955DF and the NEC MultiSync 920 and the Samsung 955DF posted the best scores among all the monitors in the colour streaking subtest. Overall, the HCL monitor was disappointing, and we recommend staying away from it.

Our last batch of tests consisted of tests that checked the flicker and screen uniformity, and included the dark screen test. The LG Studioworks 910E posted the best mix of scores here—it did the best in the screen uniformity and flicker tests. The Philips 109E5 disappointed us in the flicker test, where it posted the lowest score of all.

All CRT monitors reflect light, but the amount of reflection should not cause eye strain. Here, all the monitors posted relatively low scores, but the BenQ was the worst of the lot, with high dark screen reflection.

Philips 109E5



With all the features that you'd want, such as FFST and Aperture Grille, the Philips 109E5's low price and good performance made an obvious Best Value winner. This sleek white monitor is ideal for daily use, including Web surfing, watching movies, playing games and using office applications.



The Philips 109E5 posted the third-highest scores in the geometry test, leaving some flat-screen monitors behind. The dot pitch of this monitor is 0.25 mm—pretty much acceptable—but the best part is the high resolution it offers: 1,920 x 1,440 pixels at 60 Hz. This is the same resolution that our performance winner offers, but the Philips 109E5 is a whopping Rs 8,850 cheaper.

With the 109E5, Philips has struck the ideal balance between price, performance and features. It's the best entry-level option we've seen so far. If you want a monitor that'll get your job done in a very decent way, and is also eminently affordable, this one is your best bet.

+ Good video bandwidth, high resolutions, Aperture Grille
– None
Price: Rs 11,500

Philips 15-inch 150T Multifunction Monitor

The Philips 15-inch 150T is the kid sibling of the Philips 17-inch W, and is meant to be a convergent solution. However, it's not widescreen like the Philips 17-inch.

The display quality of this monitor is on par with the others, but the lack of a widescreen function takes the fun out of watching movies.

The monitor will look nice on your desktop, and the in-built speakers are more than adequate for music or games. It can take multiple video inputs—PC, TV, HD, DVD and VCD, and you can even hook your video camera to it.



The bundled remote is the identical to the one that ships with the 17-inch model, and controls all the functions of the monitor. Though you can set the aspect ratio to 16:9 and 4:3 as well, we suggest you stick to the full screen option. The OSD functions are well defined, and the documentation and drivers are on the CD. Overall, this is a very good 15-inch solution from Philips.

+ Several input options, OSD well-defined
– Low on features
Price: Rs 29,999

Conclusion

A good quality 19-inch monitor is a better option than smaller CRTs, or even 15-inch LCDs, which cost almost as much. The display on a CRT is sharper and more detailed than on a flat panel LCD, but you compromise on space. Working with office applications such as Excel, or design applications such as AutoCAD are less frustrating—there's a lot less scrolling required than with smaller monitors. 19-inch monitors are a choice you need to make depending on the type of the work you do.

Monitors are usually long-term investments, and they're usually the last component to be upgraded. So, do you really want to spend the next three or four years staring at a depressing 15-inch LCD or a 17-inch CRT, when you can have one of these beauties?

SCORE

BEST VALUE digit MAY 2004

CATEGORY	CRT MONITORS 19"					
Brand	BenQ	LG	HCL	NEC	NEC	Philips
Model	V991	StudioWorks 910E	HCM 985RFM	MultiSync 912SB	MultiSync 920	109E5
FEATURES (40%)						
Size (Inches)	19	19	19	19	19	19
Viewable (Inches)	18	18	18	18	18	18
F&FST (Y/N)	N	N	Y	Y	N	N
Dot Pitch (mm) (Diagonal)	0.25	0.26	0.25	0.24	0.26	0.25
Vertical Scan Rate (Hz)	50 - 160	50 - 160	50 - 160	50 - 160	55 - 160	50 - 160
Horizontal Scan Rate (KHz)	30 - 110	30 - 85	30 - 98	30 - 110	31 - 96	30 - 92
Maximum Resolution/Refresh Rate (Hz)	1600 x 1200 @ 78	1600 x 1200 @ 65	1600 x 1200@75	1920 x 1440 @ 73	1600 x 1200 @ 76	1920 x 1440 @ 60
Video Bandwidth (MHz)	176	NA	200	NA	NA	158*
CRT type	ShadowMask	ShadowMask	ShadowMask	Aperture Grille	ShadowMask	ShadowMask
W x H x D (mm)	454 x 464.82 x 462.8	435 x 439 x 460	446 x 436 x 455	442 x 443 x 447.5	442 x 453 x 455	440 x 443 x 437
Weight (KG)	23.58	17.3	20	23.8	20	17.8
RGB connector (Y/N)	N	N	No	N	N	N
Anti-Glare Coating (Y/N)	Y	NA	Yes	Y	Y	Y
Bundled Accessories (Manuals, Colour Profile, Driver and Calibrating software...)	Manual	Manual, driver CD	Manual	Manual	Manual	Driver, manual
PERFORMANCE (60%)						
Perfromance						
OSD Usability (Scale of 5)	4	3.5	3.25	3	3.5	3.75
Geometry test (Scale of 45)	18.75	10	6.5	20	6.75	15.25
Sharpness and Resolution (Scale of 35)	23.75	21.25	19.75	23	21.25	20.25
Screen Pixel Resolution (Scale of 5)	4	3.5	3.75	4	4	3.75
Color and Gray Scale (Scale of 45)	29.25	31.25	26.75	29.75	31.25	27.5
Miscellaneous Effects (Scale of 25)	12.75	17	15.25	17	16.25	14
OVERALL SCORE						
Features	16	13	19	25	14	24
Performance	29.65	26.4	30.35	40.95	33.15	35.55
Overall	45.65	39.4	49.35	65.95	47.15	59.55
VFM	2.11	1.63	2.12	1.62	2.84	3.11
Price	13,000	14,500	13995	24,500	9,950	11,500
Grade	C+	C	C+	C	B-	B

Jargon Buster

Aperture Grille: Invented by Sony, this technology uses a series of thin, closely-spaced, vertical wires, to isolate the pixels horizontally. To keep the vertical wires in an Aperture Grille properly aligned within the picture tube, one or two horizontal 'damper' wires are required. Monitors manufactured with Aperture Grille are sharper and clearer.

Colour temperature: This is the amount of white on the screen, and is measured in degrees Kelvin. Colours used in images such as landscapes, or pictures of people, look better when displayed at a colour temperature of 6500 K. However, regular black text on a white background is better displayed at 9300 K.

Sharpness or Convergence: This refers to the convergence of the three different electron guns—red, green and blue. The closer the dots fall, the sharper the image is.

Dot pitch: This is the distance from the centre of one phosphor dot to the centre of the nearest dot of the same colour, on the line directly above or beneath. The closer the dots are, the smaller the dot pitch, and the sharper the images.

High voltage regulation: This is the ability of high voltage to respond to changes in current. Good high voltage regulation means a stable display, even when changing intensity levels.

Horizontal Scan Frequency (Scan rate): The number of lines illuminated on a video screen in one second, or how fast each of the horizontal lines that make up the display are scanned, measured in kilohertz (KHz). High scan rates are required to provide sharper images at higher resolutions.

Interlaced and Non-Interlaced: In order to create a picture on the screen, the screen is divided into lines that get illuminated. In non-interlaced mode, the lines are illuminated sequentially, several times a second. In interlaced mode, the lines are not continuous—they are in two sets, alternating with each other, both sets being illuminated at the same time. This translates to flicker.

Magnetic field effect: A steel cabinet or desk, or magnetically unshielded speakers, may interfere with the picture tube's electron beams. This causes the screen to show myriad hues of blue or red.

Persistence of vision: This is the ability of the human eye to retain an image after the image has been taken off the screen. Contrasting screens, such as a black screen shown immediately after a white screen, or the movement of a white block on a black background, illustrates this phenomenon.

Pincushion: This is the effect of the inward curve of a video image, like an hourglass. All monitors experience this to an extent.

Pixel: Short for picture element, a pixel is a single point in a graphic image. Monitors display pictures by dividing the display screen into thousands (or millions) of pixels, arranged in rows and columns. It is the smallest point on a screen that can be illuminated. A pixel may only be one colour at any given time, so the image you see is the sum of all the pixels on the screen. The more the pixels, the better the resolution.

ShadowMask: This is a thin screen full of holes, attached to the back of a colour CRT's viewing glass. The electron beam is aimed through the holes in the mask onto the phosphor dots.

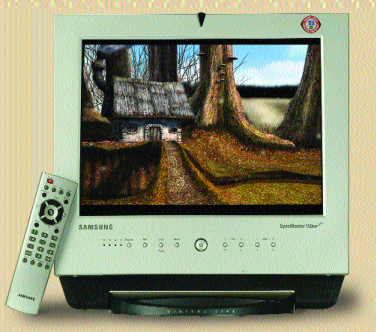
Philips 109P4	Samsung SyncMaster 955DF
19	19
18	18
Y	Y
0.24	0.26
50 - 160	50 - 160
30 - 110	30 - 85
1920 x 1440 @ 60	1600 x 1200 @ 68
261	135
Aperture Grille	ShadowMask
456 x 469 x 439	440 x 454 x 461
23.5	19
Y	N
Y	Y
Manual, driver CD, iKey and LightFrame 3 software	Manual, driver CD
3.75	3
19.25	5
23.5	18.25
4	3.75
28.75	31.5
18	16.75
32	16
41.45	30.95
73.45	46.95
2.38	1.76
18,500	16,000
C++	C++

Samsung SyncMaster 150MPplus

The Samsung SyncMaster 150MPplus is Samsung's 15-inch multifunction monitor. As a monitor, it's just vanilla, but take a look at its features, and you're sure to be impressed. It comes with an inbuilt TV tuner.

The 150MPplus is loaded with additional features: watching movies is enhanced with the PIP feature. You can control the sound from the remote; in fact, you can control everything with the remote. The inbuilt TV tuner lets the SyncMaster 150MPplus function just like a normal TV, with channel scan, fine tuning, colour control and user settings to boot. Even the remote looks like the ones Samsung bundles with their TVs.

All necessary wires and accessories, plus an extensively documented manual, are bundled. All input devices can be connected simultaneously, and you can use the source button on the monitor and remote to toggle between each source. Another function is the image quality, which adjusts the image according to the viewing needs, and makes the image sharper or softer.



If you're interested in a 15-inch LCD that can double as a TV without the hassle of setting up a TV tuner, this is a monitor you should consider.

\+ Very good display quality
\- Expensive
Price: Rs 35,400



15-inch LCD Monitors

If you're looking forward to buying an LCD monitor in India, well, you just chose the wrong country. LCD monitors are, in general, expensive here. But the good news is that last year, 15-inch LCD monitors got cheaper and better.

The levels of acceptance in a corporate environment were much higher than ever before, and the rub-off effect was felt in the home segment, too. This year, two major players—Sony and Sharp—are out of the market, while there's a new entrant in the form of BenQ. Meanwhile, the cheapest 15-inch LCD was the one from ViewSonic. Presenting a complete rundown on the 13 monitors that landed on our desks for testing.

Features

A higher contrast ratio means a monitor can be viewed well under different lighting conditions; for example, a monitor with a very high contrast ratio can be viewed in the dark without too much eye-strain, and at the same time, in bright sunlight with all colours visible clearly.

The CMV CT-259A and CT-522A have a contrast ratio of 500:1, and the others range from 350:1 to 400:1. The CT-259A also has a high brightness level of 450cd/m², which will add a dimension to your movie-watching experience. On the other hand, the Digi-View DGL-115AS has a poor contrast ratio of 250:1.

You'd consider space saving as an important aspect of LCD monitors, so depth obviously is one of the important parameters for judging. The HCL HCM 500LSA saved most space, with a total depth of 160 mm including the base, followed by the Digi-View DGL-115AS, with a depth of 173 mm. However, the HCL monitor's speakers are on the vertical support, and are therefore too close to each other—so much so that the stereo effect is completely lost.

Another factor is power consumption: LCD monitors consume less power compared with their CRT counterparts. The

SCORE BOARD

CATEGORY		LCD MONITORS 15"					
	Brand	ACER	BenQ	CMV	CMV	Digi-View	HCL
	Model	AL511	FP567s	CT-529A	CT-522A	DGL-115AS	HCM 500LSA
FEATURES (4.5%)	Pixel size (mm)	0.297	0.297	0.297	0.297	0.297	0.297
	Luminance (cd/m²)	250	250	450	250	250	NA
	Contrast ratio	350:1	400:1	500:1	500:1	250:1	NA
	Vertical scan rate (Hz)	75	75	50 - 78	55 - 78	50 - 70	55 - 75
	Horizontal scan rate (KHz)	60	63	28 - 65	28 - 65	29 - 60	30 - 60
	Maximum resolution	1024 x 768	1280 x 1024	1024 x 768	1024 x 768	1024 x 768	1024 x 768
	Video bandwidth (MHz)	NA	80	NA	NA	NA	80
	Response time (ms)	40	16	16	16	25	40
	W x H x D (mm)	353 x 368 x 204	354 x 362 x 190	348 x 334 x 186	365 x 399 x 181	385 x 375 x 173	356 x 356 x 160
	Weight (Kg)	3.2	3.5	2.6	2.3	3.3	3.7
	In-built speakers (Y/N) / watts	N	Y	1.5 W x 2	1.5 W x 2	Y	Y
	VESA Wall Mount	Y	Y	Y	Y	Y	Y
	Swivel–vertical/horizontal axis	N/Y	N/Y	N/Y	N/Y	N/Y	N/Y
	Power Consumption	35	40	33	33	36	30
	Bundled Accessories	NA	Power cord, data cable, manual, audio cable, iKey adjustment software, driver	Power cord, power adapter, audio cable, data cable, manual on CD	Power cord, power adapter, audio cable, data cable, manual on CD	NA	Audio cable, manual, driver on floppy
PERFORMANCE (3.5%)	Performance						
	DisplayMate tests						
	Sharpness and Resolution (out of 10)	6.25	6.25	6	6.5	6.5	6.75
	Greyscale range (out of 60)	31.25	36.5	37.5	38	37.25	35.75
	Miscellaneous tests						
	Viewable angle test (degrees)	150	150	150	150	150	150
	Image persistence (scale of 5)	3.25	4	3.75	3.75	3.5	3.75
	OSD usability test (scale of 5)	3.5	3.25	3	3	3	3.5
OVERALL SCORE	Overall Scores						
	Features	15	25	28	27	18	19
	Performance	33.45	28.36	35.44	36.55	27.56	28.95
	Overall Score (Performance + Features)	48.45	60.21	63.44	63.55	52.91	54.55
	Value for money	2.42	2.62	3.17	3.18	2.69	2.48
	Price (Rs)	19,990	23,000	20,000	20,000	19,690	21,990
	Grade	B-	B-	B	B	B	B-

CMV CT-522A

The CMV CT-522A was amongst the best performers when it came to detail and colour reproduction. The 'auto' setting button is featured. It's ideal for SoHo and corporate office use—it has a better brightness and contrast range, and is also good at reproducing finer details. Home users, too, can consider this monitor, given the competitive price tag of Rs 20,000.



The power rating is 33 W, which is in line with other LCDs. The monitor looks decent, with a dual-tone black and silver-grey body. The bottom support is firm, which is important for equipment as delicate as an LCD panel.

The speakers are rated at 1.5 W, which is good enough for system sounds—but not really for music, for which we recommend getting separate speakers.

+ Firm bottom support, 'auto' button for screen adjustment

– Speakers not adequate

Price: Rs. 16,500

Philips 150C was the most energy-efficient, with a power consumption of only 18W, compared to the 40W typically consumed by 15-inch CRTs. The BenQ FP567s, meanwhile, is the most power hungry-panel—it needs a good 40 watts.

But when it comes to looks, nothing beats the BenQ FP567s—it comes loaded with a white front panel, a black stand, and a silver-grey strip at the bottom that houses the speakers and buttons. The Samsung SyncMaster 152s has a sophisticated look, making it more suitable for corporates: the body is dual-tone silver-grey and black, with tiny chrome-plated buttons.

Performance

With a new monitor, the first think you'd probably look at, and the first thing you'll definitely be shown, are the features.

Caveat Emptor. Never ever ignore performance. We used DisplayMate Video Edition to test performance, as well as other miscellaneous tests, to bring out the performance issues and highlights of each monitor.

The point shape and visibility test is important for any kind of user, because it checks how well a monitor displays a detail as small as a dot. It checks, for example, whether the monitor displays a black full-stop as a black full-stop, or as a small square in a different colour. The Samsung 152s was ahead of the rest: a round white dot appeared perfectly round and white, without additional colours—red, green or blue—visible at the edge, which is not the case with most of the other panels.

However, most panels performed reasonably well in this test, with very little pixel bleeding at the edges. The CMV CT-522A also returned acceptable results, albeit with some slight bleeding at the edges.

As for video bandwidth, the higher it is the better, but all the panels we tested had a rated bandwidth of 80 MHz. In the video bandwidth test, we use thin white lines separated from each other by a distance of just one pixel, and we then try to see whether the lines appear distinct.

The Samsung 152s performed very well here, and we could see the lines as distinct even from a distance of 2 to 3 feet. We therefore recommend the 152s to users of page layout software, or, for example, fashion designers, since the monitor displays the finest of details. Some panels, such as the Philips 150X didn't perform too well—the lines could not be distinguished, and looked like a single block.

The Samsung 152s, along with the CMV CT-522A and Philips 150X, did not display any streaking or ghosting. This is good for people who work mostly on documents and spreadsheets, where bright and dark areas can be adjacent to each other.

These three panels are also good for movie-watching, because there won't be shadowing on the screen. In the white and black level shift test, there's a sharp edge between a white and a grey block. The CMV CT-522A performed very well here. Graphic artists would be interested in this, because

NEC AccuSync LCD51V	Philips 150C	Philips 150X	Samsung SyncMaster 152s	Viewsonic VE155s
0.297	0.297	0.297	0.297	0.297
250	250	250	250	250
400:1	400:1	400:1	350:1	400:1
56 - 75	56 - 76	56 - 76	56 - 75	50 - 75
31.5 - 60	30 - 61	30 - 61	30 - 61	30 - 62
1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768
NA	80	80	80	80
25	30	25	25	30
347.4 x 341.9 x 183.5	360 x 356 x 177	360 x 358 x 177	357.5 x 346.7x 184.5	356 x 344x 200
3	4.55	4.63	2.9	3.7
N	N	1 W RMS	N	N
Y	Y	Y	Y	Y
N/Y	N/Y	N/Y	N/Y	N/Y
24	18	20	31	30
Manual, power cord	Power cord	Power cord	Manual, data cable, audio cable, power cord, power adapter, wall-mount accessories, natural colour software, driver	Driver, manual on CD, quick start guide, data cable, power cord
6.25	6.25	6.25	7.5	6
39.5	34.25	37	36.25	36.25
150	150	150	150	150
4	3.75	3.25	4	4
3.75	3	3	4	3.75
21	18	20	22	20
29.3	27.32	28.08	29.8	28.65
58.10	51.33	55.49	58.45	55.35
2.58	2.44	2.52	2.69	3.08
22,500	21,000	22,000	21,720	18,000
B-	B-	B-	B-	B

Apple Cinema Display 20-inch

When we first saw the iMac, we were surprised by its size, but amazed by the quality and clarity of the display. The sad part is that this display is only available with the iMac. So, Apple came out with the dazzling Cinema Display series, but stubbornly kept its connectivity options limited to Apple computers. The Cinema Display that we got had the same issue, but a little research revealed that adapters that will let you connect them to regular PCs are available.

The Apple Cinema Display comes in a 20-inch wide-screen version, but even bigger ones are available. The display is encased in a stunning fibre-glass body, and is lighter than the LG 23-inch. This unit could not be tested using our standard tests, as we couldn't connect it to a PC. Also, the resolution on the Apple G5 was set to 1,680 x 1,050, which isn't available on the PC. It should default to 1,600 x 1,024 if connected to a computer with a high enough resolution for this monitor. As of now, only 3DLabs has made a video card—the Oxygen GVX420—which supports the Apple display natively.

We received a G5 to test this display, and it was just magical. We just couldn't find any dead pixels, bright spots or colour differences; in fact we couldn't find anything wrong at all. We



put on the *Terminator 2: Judgement Day* DVD to check the quality of the display, and found ourselves ducking to avoid bullets. Images were razor-sharp, and colours as vibrant as we've ever seen. In short, this monitor is absolutely brilliant.

The Apple Cinema Display will find favour with all users who use Macs for video editing and designing. As for PC users, help is at hand in the form of third-party solutions that allow you to connect it to a PC, but you'll need a heavy-duty card that can support a resolution of 1,600 x 1,024 with ease.

\+ Excellent display quality
– Cannot be connected to a PC without third-party connectors
Price: Rs 86,600 plus taxes

poor performance on this test means graphics can look dull and lifeless. Sharpness demands that the colour change sharply at edges.

In the 16 intensities test for primary colours, the CMV CT-529A and the NEC AccuSync LCD51V were good performers. What this shows is that the auto-calibration feature of these panels is set better than on the others. This test is of importance for digital imaging artists, and, especially, layout artists who make marketing collateral, brochures and magazine covers—where proper colour reproduction and variation amongst shades is critical.

The viewable angle test saw amazing consistency: All panels were visible from 150 degrees. However, different panels had their issues—some displayed a slight red tinge, and others a slight blue tinge, at wide angles. We suggest users sit right in front of the monitor, and if there are more people around, it would be a good idea to space them all within the 120-130 degree range.

At the end, in the 15-inch LCD category, it was the two CMV models that made it to the top. A 0.11-point difference in performance scores between the CT-522A and 529A was the decider, and we awarded the CT-522A both the best performance and best value award.

Conclusion

The 15-inch LCD category is hot right now, because of falling prices. In our tests, it was close competition between the CMV, BenQ and Samsung monitors.

The CMV monitors got to the top slot—they have better features as well as commendable performance. The BenQ FP567s wasn't far behind, though. It's also a great looking model. The Samsung 152s returned some terrific results in a few tests—it carved a niche for itself; it's a great monitor when finer details are more important.

The Acer AL511 and the Philips 150C aren't really up to the mark in this category, whether it's about features or performance.

DECISION MAKER

You need	A monitor for home use—working on documents, e-mail, surfing the 'Net and playing games over the weekend	A compact monitor for your small office where display quality is important, with low power consumption	A monitor for gaming use, where high refresh rate, brilliant colour reproduction and brightness are important	A monitor for designing and graphics applications. It should be able to reproduce fine details and colours, and offer accurate geometry	A monitor to watch DVD movies, VCDs and TV programmes
Look for	A compact monitor that has 110 MHz video bandwidth for better refresh rates at high resolutions	An LCD panel, as it consumes less power and saves a lot of space. It is flatter and brighter than a CRT monitor, and strains your eyes less	CMV CT-522A, Samsung SyncMaster 152s	A 19-inch or 21-inch Aperture Grille monitor for the best results. Also make sure it can handle a refresh rate of 75 Hz at 1,600 x 1,200 pixels	For best geometry results, 17-inch or larger LCD panels are best. You can also try 19-inch Aperture Grille technology-based CRT monitors	A wide format (16:9) LCD is what you should look for. Also look for wall mounting capability
Our pick	Samsung 763MB, LG E700S	Philips 109P4, NEC MultiSync 912SB	Samsung SyncMaster 1723MP, Samsung SyncMaster 172s, NEC MultiSync 912SB (CRT)	LG L2320A, Philips 170T
Price	Rs 8,500 - 9,500	Rs 18,000 - 22,000	Rs 18,000 - 25,000	Rs 24,000 - 38,000	Rs 50,000 - 1,85,000

17-inch LCD Monitors

OK, first a damper. Seventeen-inch LCD monitors are expensive—one panel costs as much as a fully-functional PC. However, prices here too have fallen, and the cheapest model this year is Rs 27,000—a drop of around 30 per cent from last year's Rs 38,000. But it is still an expensive proposition to buy one.

For our comparison, we tested 13 models from nine brands.

Features

The Samsung 173P offers the best contrast ratio and brightness of 700:1 and 270 cd/m² respectively, as per the specification sheet, making it the best choice for movie viewing and gameplay. The higher brightness means that that you can adjust the monitor to a higher brightness level when needed, while being able to reduce it when working with white backgrounds.

The brightness figure of 270cd/m² can light up the screen enough so you can view weapons placed on a corner table in a dimly lit room of an action adventure game. The contrast ratio of 700:1 can help adjust the monitor to get it to display any colour or shade; the slightest difference between shades become visible. This monitor also has highest video bandwidth—140MHz—of all the monitors in the comparison, allowing it to reproduce fine details at a higher resolution and refresh rate.

The pixel response time, which is the time each pixel takes to switch on or off, was the lowest in the Acer AL712 and the Umax V7, at 15ms. This means that the image quality on these panels should be the best, but low response time is not the sole criterion for performance; we didn't see either of these models top any of the performance tests.

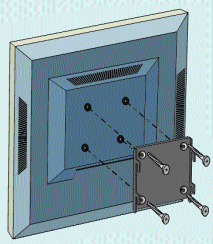
Speakers are, more or less, considered a default accessory with LCD panels, and most of the panels we compared featured speakers, except for those from two vendors—Samsung and LG. If you want to wall-mount a panel, opt for the light Philips 170N. But a good set of speakers will set you back by another Rs 1,500 or so, eat up desk space, and increase wire clutter.

One good improvement in design we came across, compared to the LCDs of last year, was the drilled hole (see box '*VESA Wall mount*'), provided with every monitor we tested. However, we

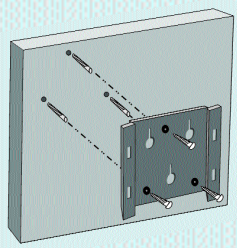
VESA Wall Mount

Video Electronics Standards Association (VESA) is a non-profit organisation that sets standards for displays. These standards are adhered to by most display (CRT and LCD) manufacturers worldwide. VESA Wall Mount is the standard set by VESA, using which any brand of monitor can be mounted using any third party VESA-compliant wall mount fixture. Here we'll see how to fix an LCD with wall mount fixtures, and hang it on a wall.

1. First things first: check whether the LCD panel is wall-mountable. Look for four drilled holes at the back of the panel, at a distance of either 75 mm or 100 mm.



2. After this, remove the stand, or if the design allows, fold it. Now it's time to fix the sheet metal back plate—this comes bundled with some monitors, and can be bought from the manufacturers or third party vendors—which has four U-shaped pegs that fit into the grooves of the plate.
3. Now, the other plate that's provided must be fixed on the wall where the panel is to be mounted, with the help of bolts.

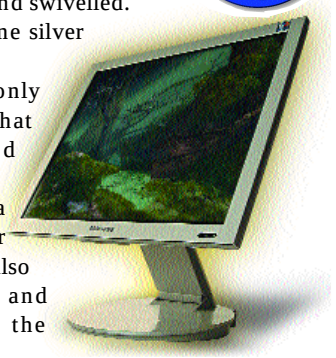


4. Match the four pegs of the back plate with the ones on the wall and hang the monitor.
5. Apply a little pressure on the panel to check whether the panel is securely fixed.

You can also opt for a mounting arm, which will offer you the flexibility of being able to move the LCD panel back, forward, up and down. This is more suitable for showroom owners and reservation counters.

Samsung SyncMaster 173P

This monitor is such a pleasure to look at, you'll watch it even when it's off. The panel has a round bottom with a silver lining, and a front panel just an inch in thickness. The panel can be height-adjusted, and can be both tilted and swivelled. The front panel has just one silver button—the power button.



The 173P is also the only 17-inch LCD we tested that features the landscape and portrait modes. These features make the 173P a good display solution for professional use; it could also be used in showrooms and restaurants, gelling with the interiors.

And the performance is definitely something to write home about: the 173P returned the best results in the 64-intensities aspect of the primary colour test. The test screen was one of the more difficult ones to produce: there were 64 shades ranging from black to white, and this monitor reproduced them all brilliantly.

The only sore point about the 173P is the separate power adapter, which is bulky and hard to manage. At Rs 47,500, it's definitely on the higher side, but it's worth the money if you want the best.

+ Very good performance
– Bulky power adapter, expensive
Price: Rs 47,500

have serious doubts about the availability of accessories such as bolts, back plates and arms that are fitted on the wall. We think it's time LCD vendors began to offer these as standard accessories.

OSD (On Screen Display) buttons are the set of buttons on the monitor using which you set the different parameters of the monitor, such as brightness and contrast, geometry, and so on. We found the Samsung 172s to be the best in terms of ease and access of OSD buttons. The Samsung 173P, on the other hand, doesn't have any buttons on the panel for OSD functions; it comes with the MagicTune software to take care of OSD functions.

Landscape-to-portrait mode is a great feature—it's very useful while browsing through a long Web page or Excel sheet. The Samsung 173P was the only model to offer this.

The 173P comes bundled with the Pivot Pro utility which, once installed, rests in the taskbar and allows the user to switch from landscape to portrait mode at the press of a button. Of course, you need to physically rotate the screen. The 173P was also the only monitor to have just a power button onboard. The MagicTune utility is provided to take care of OSD functions. This approach is both good and bad. It's good because you have no buttons on the panel, which adds to the look, and besides, people are more comfortable using a mouse rather than tiny buttons.

It's bad because, if the software is deleted and you don't have the installation CD handy, you're stranded until you get the software from somewhere, somehow!

CMV CT-722A



The CMV CT-722A is the 17-inch LCD of choice for budget users. It's one of the cheapest 17-inch LCDs available, and doesn't miss out on anything as far as performance goes. You won't regret having bought this monitor, whichever way you look at it. In the looks department, it sports the dual-tone black and silver-grey look, which is the in thing right now. There's an 'auto' button that takes care of monitor adjustment—the geometry as well as the contrast and brightness.



Rs 27,000 means this panel is affordable for many SoHo users. Home users would be advised to wait another year for the price to drop further.

+ Affordable; 'auto' button for display correction, looks great
– None
Price: Rs 16,500







CATEGORY				LCD 17"			
	Brand	Acer	BenQ	CMV	LG	NEC	Philips	Samsung
	Model	AL712	FP767	CT-722A	Flatron L1720B	MultiSync 1760NX	170N	SyncMaster 173P
FEATURES	Pixel size (mm)	0.264	0.264	0.264	0.264	0.264	0.264	0.264
	Luminance (cd/m²)	250	260	400	250	260	260	270
	Contrast Ratio	500:1	500:1	450:1	450:1	450:1	400:1	700:1
	Vertical Scan Rate (Hz)	56 - 76	56.25 - 75	50 - 76	56 - 75	75	56 - 76	56 - 75
	Horizontal Scan Rate (KHz)	24 - 80	31.47 - 83	28 - 62	30 - 83	81	30 - 82	30 - 81
	Maximum Resolution	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024
	Video Bandwidth (MHz)	110	135	NA	110	NA	135	140
	Response time (ms)	15	16	16	16	16	25	25
	W x H x D (mm)	374 x 394.5 x 204	382.7 x 404.3 x 200	400 x 388 x 192	394 x 412 x 128	374 x 343.8 x 205	399 x 398 x 197	382 x 236.2 x 395
	Weight (KG)	5.9	3.5	4.3	4.8	6.3	4.7	6
	Built in Speakers (Y/N) / Watts	Y	Y	Y / 2.5 W x 2	N	N	Y	N
	VESA Wall Mount (Y/N)	Y	Y	Y	Y	Y	Y	Y
	Swivel/Tilt (Y/N)	N/Y	N/Y	N / Y	N/Y	Y/Y	N/Y	Y/Y
	Power Consumption	54 W	50 W	45 W	40 W	38 W	40 W	40 W
	Bundled Accessories	Power cord	Manuals, colour profile, driver, calibrating software, data cable, audio cable, power cord	Quick setup guide, electronic manual	Power cord, data cable	Naviset colour profile, driver, manual	Data cable, power cable, audio Cable	Natural colour, Pivot Pro, MagicTunes software, drivers, wall-mount accessories, DVI-Data cable, manual, power cable
PERFORMANCE	Displaymate Video Edition							
	Sharpness and Resolution (out of 10)	6	6.75	6.75	6.75	5.75	5.75	6.5
	Greyscale range (out of 60)	36.75	37.25	37.5	36.625	39.25	42.25	42.75
	Miscellaneous tests							
	Viewable angle test (degrees)	150	150	150	150	3.75	150	3.875
	Image persistence (scale of 5)	3.5	3.5	3.75	3.75	2.5	3.75	3.625
	OSD usability test (scale of 5)	3.25	3.75	3.5	3.5	2.5	3.75	3.625
OVERALL SCORE	Overall Scores							
	Features	25	30	26	25	28	29	36
	Performance	39.45	40.3	39.45	39.35	39.5	43.25	44.3
	Overall Score (Performance + Features)	64.45	70.3	65.45	64.35	67.5	72.25	80.3
	Value for Money	2.91	3.08	3.39	2.82	2.74	3.37	2.25
	Price (Rs)	30,999	32,000	27,000	32,000	34,500	30,000	47,500
	Grade	B	B	B+	B-	B-	B+	B-

Acer	BenQ	CMV	Digi-View	HCL	LG
Acer India Ltd 080-5219520 rajesh_aiyer@acer.co.in www.acer.co.in	BenQ India Pvt ltd 022-25705231 hcsheth@esysmail.com	Cee Vision Technologies Pvt.Ltd. 022-26733353 chemoplastmumbai@vsnl.net www.cmv.com.tw	D-Link India limited 022-26526696 sales@dlink.co.in www.dlink.co.in	HCL Peripherals 044-34539847 kiruba@hclp.com www.hclp.com	LG Electronics India Pvt Ltd 0120-2560902 response@lgezbuy.com www.lgezbuy.com

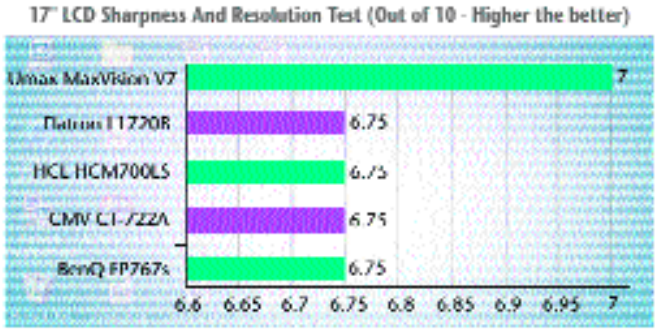
Microtek	Philips	Samsung	Samsung*	Umax	Viewsonic
Microtek International Ltd 022-28362407 an.bom@mtk.sril.in	Philips India Ltd 022-56912325 PCP.India.Info@philips.com www.philips.com	Samsung India Electronics Ltd 011-51511234 marketing@samsungindia.com www.samsungindia.com	Savex Computers Ltd 022-22886161 www.samsungindia.com * Samsung SyncMaster 150MP plus* Samsung SyncMaster 773s	Neoteric Informatique 022-24172600 sales@neoteric-info.com http://www.neoteric-info.com	Priya ltd 022-56663100 sejal.shah@priyagroup.com www.viewsonic.com

Performance:

The contest between the Samsung 173P and the Philips 170N was close, with just a one-point difference in scores between them. Lack of features such as height adjustment, and absence of colour calibration, made the Philips lose out on the overall score. However, if you just consider performance, the winner was the Samsung 172S.

In the point shape and visibility test, the Samsung 172S returned the best results, with the dot reproduced perfectly, without any pixel bleeding—this means it's a good choice for designers, graphic artists and movie editors.

The Umax V7 was the best performer in the video bandwidth test—this means the V7 is a good choice for playing games at high resolutions. Also, 3D software users can take advantage of its video bandwidth, as the monitor affords higher resolutions and refresh rates.



Samsung SyncMaster 172MP	Samsung SyncMaster 172s	Umax Maxvison V7
0.264	0.264	0.264
250	270	250
700:1	350:1	400:1
56 - 75	56 - 75	56 - 75
31 - 81	30 - 81	31.5 - 80
1280 x 1024	1280 x 1024	1280 x 1024
135	135	NA
25	25	15
412 x 415 x 203	385 x 396.3 x 216	413 x 414 x 195
4.9	4.7	5.13
Y	N	Y
Y	Y	Y
N/Y	N/Y	N/Y
58 W	42 W	NA
Manual, natural colour driver, data cable, power cord, external TV tuner card, remote control	Manual, natural colour driver, data cable, power cord, power adapter, wall mount	Manual, power adapter, data cable, audio Cable
6.75	42.2	7
25		39.25
150		140 - 145
3.75	4	4
3.25	4	2.75
31	27	22
31.75	44.65	41.05
62.75	71.65	63.05
1.42	2.80	3.04
61,800	36,840	29,000
C	B-	B

In the streaking and ghosting test, the Samsung 173P and the Philips 107N returned impressive results. We strained our eyes trying to find some slight streaking or ghosting, but there was none. These two are, therefore, good for movie buffs.

The Philips 170N returned excellent results in the level shift test, with no pixel bleeding at the edge. The Acer AL712 fared poorly here. People who use image-restoring software, and also those who do image editing, should consider the Philips 170N.

All the monitors we tested gave average results in the text-colour combination test. We observed that text in magenta was consistently reproduced poorly, by all the panels. Magenta on dark colours, especially, appears crooked, and prominent black dots are visible between the magenta dots. The same was the case with red text on a dark background. We therefore advise marketing and sales people in advertising agencies to stay away from LCDs altogether for presentations, where dark backgrounds and coloured texts are used.

In the colour scales test, colours are presented from their darkest to their brightest areas. The NEC MultiSync 1760NX did the best. This was the only LCD where we could see the darkest as well as the brightest blocks. Other panels missed out on either the darker or on the brighter side.

The Samsung 173P stole the show in the performance department. It also scored high on looks, something which is very important for an expensive, lifestyle product such as an LCD panel.

Conclusion

Though LCD monitors are expensive, once you take a look at one of these beauties, you're sure to get hooked. There are 17-inch LCD monitors for all kinds of buyers—from those who want the best, to those who look at the price tag. Each monitor has its feature set and performance level, and is priced accordingly. Price drops will probably happen soon enough. We can also expect to see more vendors entering the market.

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Zire Fire, and Tungsten Zen

Imagine scheduling an urgent meeting, calling up all the executives and getting all the other things on the agenda in place—all from the Palm in your hand. Here are seven PDAs that vie for your attention and promise you that... and more!

Handhelds are much more than souped-up digital diaries; a good Personal Digital Assistants (PDAs) can completely change the way you work and play, especially while on the move.

Since the introduction of the first Palm Pilot in 1996, the Palm OS has been the defining factor in the adaptation and evolution of mobile computing. With a Motorola 16 MHz processor and 128 KB of memory, the Palm Pilot 1000 was the first device to feature the Palm OS (v1.0). Since then, the OS has seen numerous revisions and upgrades, continually improving over time.

With a majority market share and millions of devices sold, the Palm OS has become the standard for mobile computing. A wide variety of devices running Palm OS, suitable for different user categories, are now available. The OS also enjoys excellent support from software developers and hardware vendors alike—with loads of options from third-party vendors and independent developers.

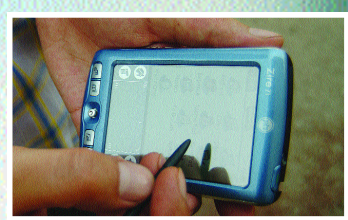
Add-on products, such as expansion cards, wireless keyboards, modems, etc., are easily available. Apart from all this, ease of use, great compatibility with Windows-based programs, minimal memory usage and long battery life make devices running on the Palm OS a popular choice world-wide.

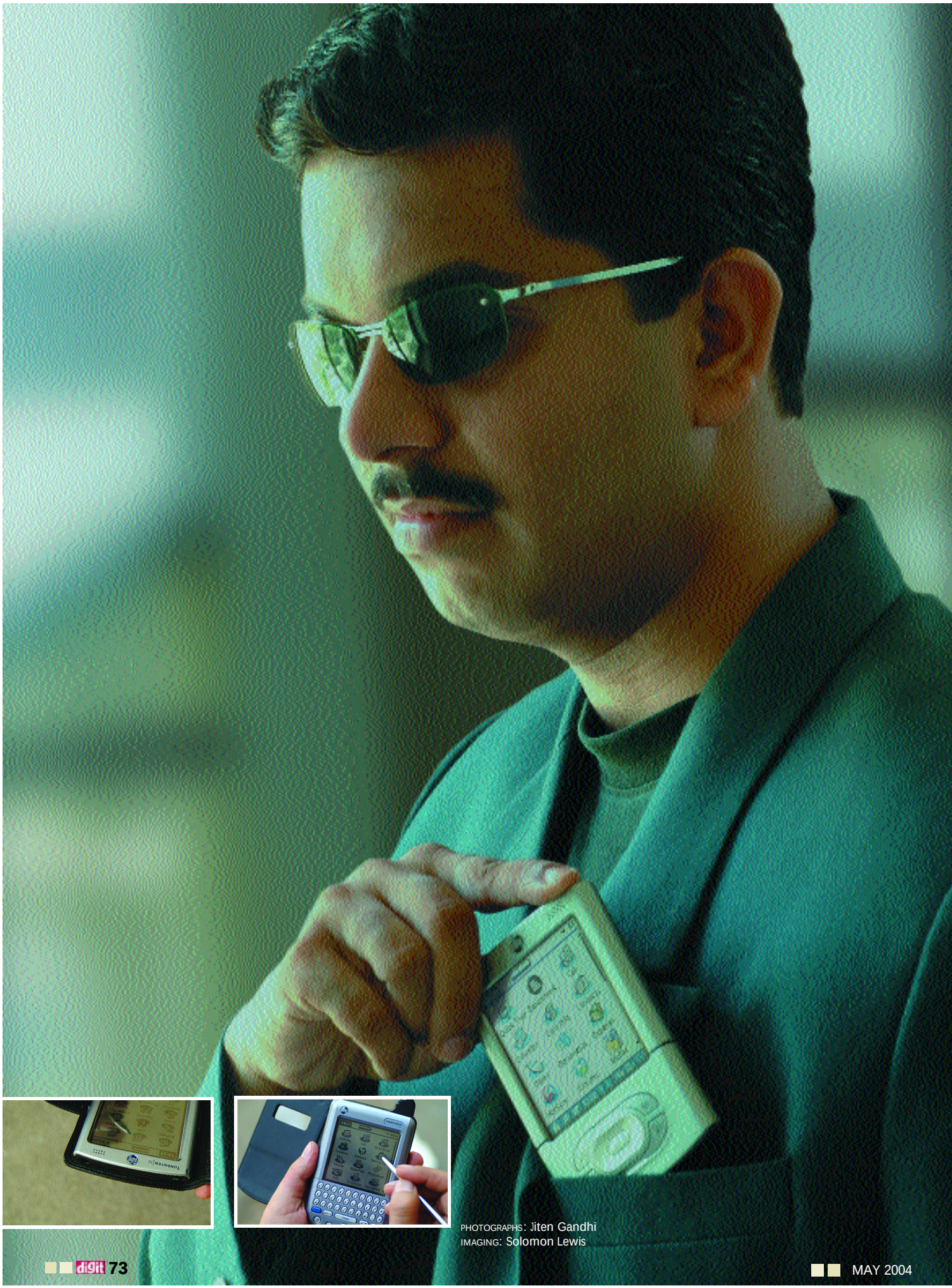
Palm devices currently run the v5.x platform. New developments on the OS front include the Palm OS Garnet and Cobalt. Palm OS Garnet is an enhanced version of Palm OS 5, and provides support for a broad range of screen resolutions, dynamic input area, improved network communication and Bluetooth. Cobalt-Palm OS 6 is the next generation of the Palm OS, and has been designed from the ground up, to support new classes of device such as smartphones.

On the hardware front, we've already been seeing a range of Palm OS devices, right from entry-level solutions for first time users, to business PDAs with stretch displays, and smartphones such as the Tungsten W. To help you make an informed decision, we look at some devices running the Palm OS.

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PHOTOGRAPHS: Jiten Gandhi
IMAGING: Solomon Lewis

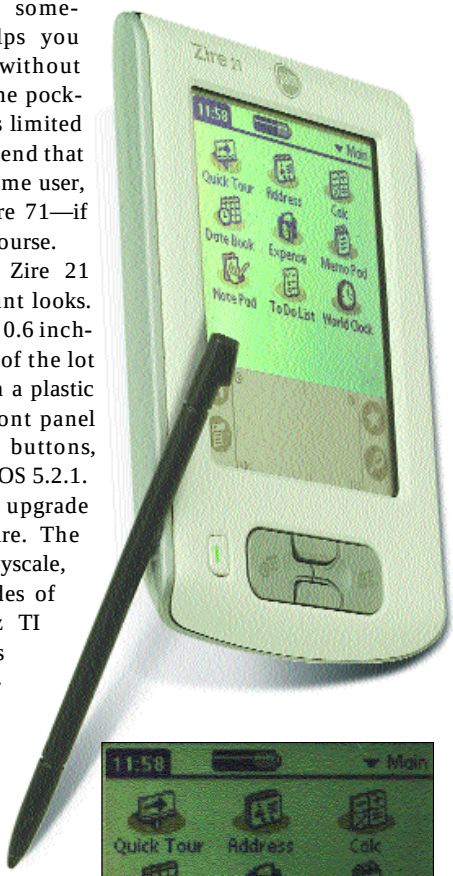
Palm Zire 21

The Palm Zire 21 is ideal if you just want something that helps you organise your life, without being too heavy on the pocket. But considering its limited features, we'd recommend that even if you're a first-time user, you should buy a Zire 71—if you can afford it, of course.

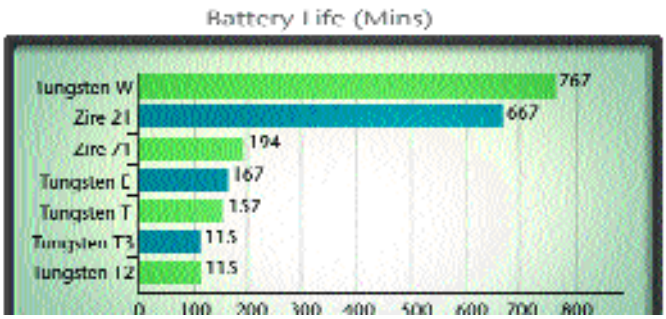
Design-wise, the Zire 21 sports plain, yet elegant looks. It measures 4.4 x 2.9 x 0.6 inches, and is the lightest of the lot at 108 gm. Encased in a plastic body, with a white front panel and grey application buttons, the device runs Palm OS 5.2.1.

It's a significant upgrade from the original Zire. The screen is 160 x 160 greyscale, and displays 16 shades of grey. The 126 MHz TI OMAP311 processor is probably over-powered for most applications you're likely to use on the Zire 21.

Going by the features provided, you'll use the device mostly for its PIM functionality, so the 7.2 MB of user-available storage should be more than enough to store your contacts, to-dos and notes.



The Zire 21's 160 x 160 greyscale screen does not have a backlight.



It's an ergonomically good device. There's no backlight, however, so you can't view the display in the dark. The internal battery lasted us a cool 11 hours and seven minutes.

There's no card expansion slot and no universal connector either, which puts expansion capabilities at zero. In terms of connectivity, you only get Infra-red to pair it with a compatible device. There's no cradle, and the internal battery can be charged through the provided AC adapter. The battery also charges when it's connected to a PC through a USB port.

The Zire 21 comes with standard Personal Information Manager (PIM) applications including Date Book, Address, Calculator, To-do, Notepad and World Clock. You also get other useful applications such as Handmark's MobileDB, Handmark PDA Money, Palm Reader, PowerOne Personal Calculator and Handmark's MagicDogs Playing Cards.

\+ Economical
\- Lacks features
Price: Rs 7,249

Palm Zire 21	A-
Performance	
Features	
Ergonomics	
Value for money	

How We Tested

The complete range of Palm OS-based PDAs was tested on the parameters of features, performance, battery life and ergonomics. The weightages allotted were 55 per cent for features, and 15 per cent each for the rest. In features, we looked for connectivity options, screen capabilities, memory and media playback capabilities, as well as special features such as an integrated camera and keyboard, among others.

To test performance, we used Benchmark 2.0, PilotMark and Speedy 3.3. Benchmark 2.0 performed the CPU and memory-intensive Fibonacci calculation test, and provided a percentage score relative to the Palm IIIe. PilotMark showed the time taken by the device to read, write and copy 1 MB of data. Speedy 3.3 tested the CPU, memory and graphics, and gave a score relative to the Palm Vx.



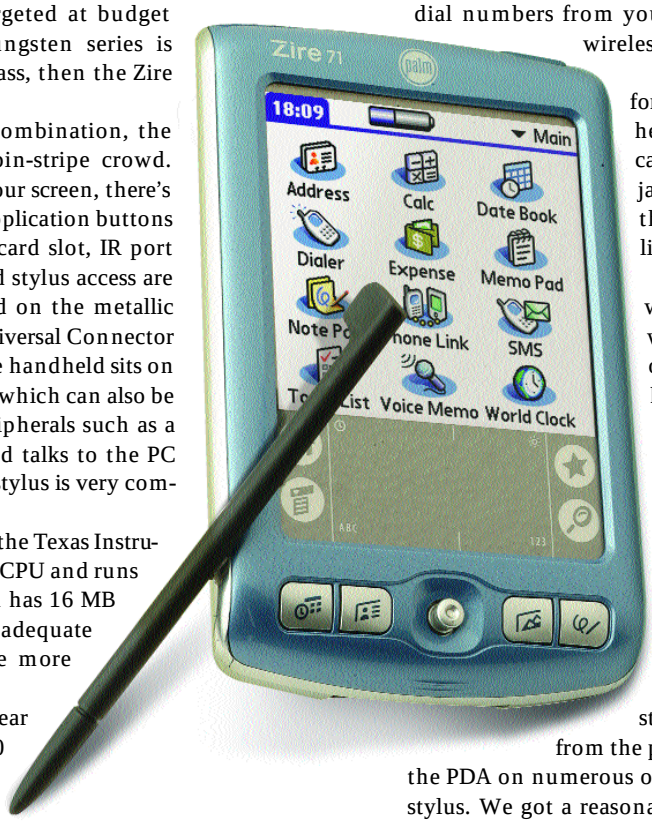
To test battery life, we set the screen brightness and volume to 50 per cent, and played a movie trailer, looping continuously until the battery died.

Ergonomics took into account button placement and tactile feel, how easy the device was to hold and use, and so on.

Palm Zire 71

If the Palm Zire 21 is targeted at budget users, and the Palm Tungsten series is meant for the business class, then the Zire 71 is for the rest of us.

With a blue and silver combination, the PDA stands out from the pin-stripe crowd. Apart from the 320 x 320 colour screen, there's a five-way joystick and four application buttons on the front panel. The SD card slot, IR port power button, stereo jack and stylus access are on top. The speaker is placed on the metallic rear panel, while the Palm Universal Connector is, as usual, at the bottom. The handheld sits on its cradle via this connector—which can also be used to connect to other peripherals such as a modem and a keyboard—and talks to the PC via the USB port. The plastic stylus is very comfortable to use.



The Zire 71 is powered by the Texas Instruments OMAP310, a 144 MHz CPU and runs Palm OS 5.2.1. The handheld has 16 MB of internal memory, which is adequate for most, but we felt a little more would be welcome.

Pulling out the metallic rear panel reveals the 640 x 480 digital camera, and the screen becomes the viewfinder. Now you can use the dedicated shutter button (hidden on the top of the slider), or the joystick, to click pictures. Though there's no flash, you can adjust the resolution (160 x 120, 320 x 240, or 640 x 480) and save images in the RAM, or on the memory card. The desktop component of the Palm Photos application allows you to synchronise images between the handheld and the PC. We really missed Bluetooth support, though.

The handheld comes with a good selection of software—an SMS application, Audible Player for audio books, Kinoma Player for movies, RealOne Player for MP3s, Palm VersaMail, PowerOne Calculator for crunching tax returns and Adobe Acrobat Reader for Palm. If you have an IR-capable cell phone, and a subscribtion to the required services from your service provider, you can link the Zire 71 and the cellphone to access the Internet, send and receive e-mail, exchange SMS messages, dial numbers from your PDA contacts list and even perform wireless HotSync operations.

The 144 MHz processor is fast enough for most applications and games. The handheld doesn't have a full-battery charge indicator. Also, the output from the headphone jack isn't decent enough. The screen, though, is exceptionally clear, uniformly lit and bright.

The button layout is a pleasure to work with. The five-way joystick lets you browse with one hand, and the slider camera operation can be accomplished single-handedly as well.

The images turned out better than those we took with cellphone cameras. However, since the shutter speed is a bit slow, you'll need to hold the PDA in place after clicking a picture, to avoid blurry images.

The mono speakers are badly placed—at the rear of the unit. As a result, alarms, game sounds and the like come out as faint squeaks. Similarly, the stylus could have been placed further away from the power button—we accidentally turned off the PDA on numerous occasions while attempting to retrieve the stylus. We got a reasonable three hours and 14 minutes of continuous playtime using the Kinoma media player, with the battery fully charged.

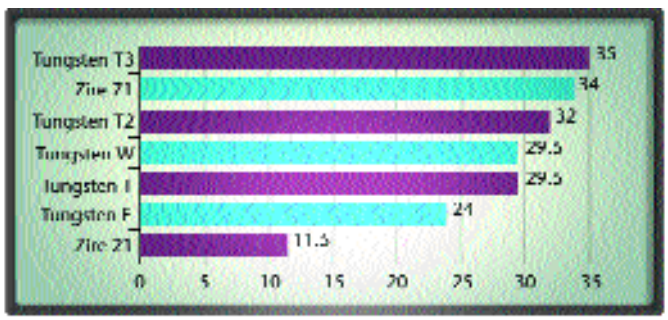
With its funky looks, integrated camera and multimedia capabilities, the Zire 71 will appeal to the youth.



▲ *The Zire 71's screen becomes the camera viewfinder when you open the slider*



Bond's suave expression on the Die Another Day trailer



+ Integrated camera
- Few connectivity options
Price: Rs 19,999

Palm Zire 71	B-
Performance	
Features	
Ergonomics	
Value for money	

Palm Tungsten E

This entry-level business PDA is encased in a slick metal casing. Running Palm OS 5.2.1, the Tungsten E measures a mere 4.5 x 3.1 x 0.5 inches and weighs just 130 grams. It can easily be slipped into a jacket or shirt pocket.

The facia includes the 320 x 320 TFT screen, and the traditional silkscreen area. Under this, you find the rectangular five-way navigator with two application buttons on either side. The stylus is located in a partly covered silo, while the expansion card slot, IR port, stereo headphone jack and power switch are on top. The charging port and the USB cable connectors are at the bottom, and the speaker is at the back. The steel finish casing tapers inwards from both sides, goading the E into conference rooms.

For a business solution, this PDA has limited connectivity options. You only get the card expansion slot and infra-red; there's no Bluetooth or wireless capability. Also, Palm has done away with the Universal connector, and opted for a direct USB connection for PC synchronisation.



The Agenda screen displays appointments and tasks for the day

A charger and a USB cable, both of which connect directly to dedicated sockets at the bottom, come with the package. Playback of audio and video clips is supported by the bundled software. MP3 playback requires an external memory card, though.

Standard PIM applications—calendar, contacts, and world clock—come pre-installed, and the calculator is installed at first HotSync. The Software Essentials CD includes Documents To Go, Palm Dialer, RealOne Mobile Player, Kinoma Player, and Palm Reader, apart from other useful applications.

The 126 MHz processor ensures smooth playback of audio and video. The audio quality from the integrated speaker is decent. Usability is excellent, and synchronising the device is a breeze. However, the rectangular five-way navigator requires that you use the tip of your thumb to scroll. Application buttons, too, lack depth. In our battery drain test using Kinoma player, the internal Lithium-ion polymer battery yielded two hours and five minutes of playtime before the device gave its first low battery warning, but it ran another 42 minutes before shutting off.

The Tungsten E is ideal for a budget-conscious business user who has no use for frills, so long as he or she can be productive on the move.

+ Extremely light
- Lacks connectivity features
Price: Rs 13,999

Palm Tungsten E	B-
Performance	
Features	
Ergonomics	
Value for money	

Change that Look

The Palm OS is flexible enough to allow for utilities that change the icons and the look of the interface. Some even change the way applications launch, suggest colour themes and backgrounds, and even provide battery status, alternate data input methods, etc. Do check compatibility with your device, and the Palm OS version, before you start experimenting, though!



Enhance your usage experience with your Palm device using SilkScreen

One such utility, SilkScreen ***(www.rogame.com/pages/SilkScreen.html)***, serves as an application launcher and lets you perform all functions associated with the silkscreen in the main display. It reserves space at the four edges of the screen. Enable SilkScreen to use four virtual buttons that perform the same actions as the buttons in the graffiti area. You can also write in the main display area. A menu lets you access any installed application, or on the memory card. You can also check battery status and access the virtual keyboard, brightness, and so on.

ZLauncher ***(www.zztechs.com/en/zlauncher.php4)***, lets you change backgrounds, colour schemes and fonts. It includes a theme manager, and a file manager that gives you access to all data stored on the device, or on the expansion card. Besides standard operations such as deleting, organising, copying and moving data, the file manager also lets you beam a file directly. You also get battery and memory status, a virtual power-off button and so on.



ZLauncher changes the look and feel of your Palm device

SilverScreen ***(http://www.pocketsensei.com/silverscreen.htm)*** is another popular application launcher. It has a pop-up toolbar where you can drag and drop application icons or files to get info, categorise, beam, or delete them. You can assign two applications to hotspots, and get a list of recently-accessed applications.

Other interface enhancements include tab-based access to various categories of application, and a ticker that displays to-dos and appointments. Theme support is excellent, and you can customise almost everything, including application icons, fonts, battery status meter and even scroll bars.

Palm Tungsten T and T2

The core business line of PDAs from Palm, the Tungsten T and T2 are sleek and feature an innovative slide-out design. Palm India doesn't retail the T, but encourages bulk buys from corporates.

Though both use the same processor and are exactly the same in terms of design and features, the T2 is the later model, running Palm OS 5.2.1; the Tungsten T runs Palm OS 5.0. This means that the T does not have Graffiti 2, Colour Themes and Writing Area—Writing Area allows you to use the entire screen as a Graffiti 2 input area. It also allows you to see pen strokes as you write, if this option is selected.

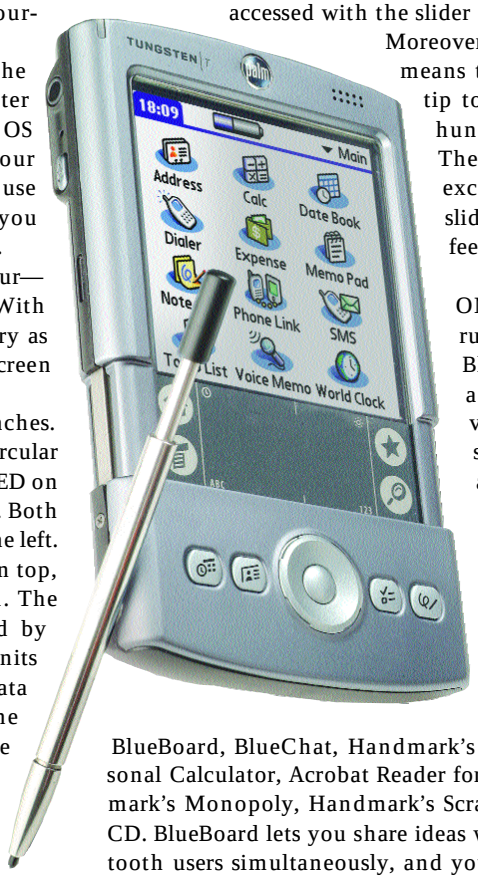
Apart from this, there is a slight difference in body colour—a gunmetal finish for the T, and metallic silver for the T2. With 32 MB of internal storage, the T2 has double the memory as compared to its predecessor, and a transreflective colour screen that's better than the original Tungsten T display.

Both PDAs weigh 159 gms, and measure 4 x 3 x 0.6 inches. Apart from the 320 x 320 colour screen, both have the circular five-way navigation key, four application buttons, a small LED on the top left and a speaker on the corresponding right side. Both have a voice recorder button and a 3.5 mm stereo jack on the left. Power buttons, expansion card slots and the IR ports are on top, while the Palm Universal Connectors are at the bottom. The spring-loaded stylus is concealed, and can be accessed by pressing the protruding end. The bottom on both the units slides out to reveal the graffiti area. If you want to access data just by using the stylus and the buttons, you can leave the slider closed.



Pairing the Tungsten T2 with a Bluetooth-enabled mobile phone is child's play

A clear clip-on plastic screen cover is cut out to expose the five-way navigator, so you can peruse without removing the cover. You can also press down once on the button in the centre of the navigator to display the date and time, or hold it down to display the home screen, from which you can launch applications. The reset button now hides at the rear, and can only be accessed with the slider open.



Moreover, the wider reset access hole means that you can use the stylus tip to reset the PDA, instead of hunting for a pin or paper-clip. The build quality for both is excellent—even with the sliding design—and both PDAs feel rugged.

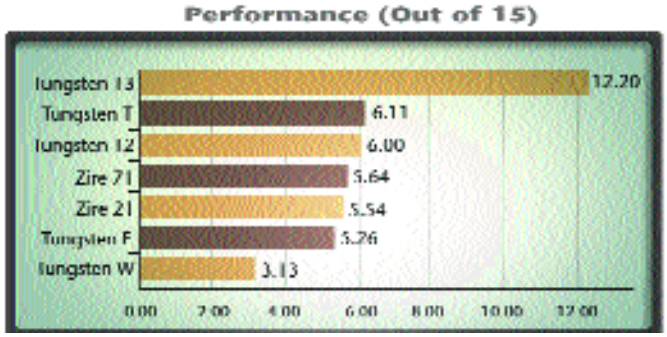
With Texas Instruments' OMAP1510 ARM processors running at 144 MHz, you get Bluetooth, a voice recorder, an external speaker, MP3 and video playback. The PDAs sync with a PC through the accompanying USB cradle.

In terms of applications, both PDAs come loaded with the usual PIM applications. A generous bundle of third-party applications—Documents to Go, Chapura Pocket Mirror (for syncing with Outlook), BlueBoard, BlueChat, Handmark's MobileDB, PowerOne Personal Calculator, Acrobat Reader for Palm, Palm Reader, Handmark's Monopoly, Handmark's Scrabble—are provided on the CD. BlueBoard lets you share ideas with up to three other Bluetooth users simultaneously, and you can chat using BlueChat. Some applications—VersaMail, Web Browser Pro, WAP Browser, Dialer and SMS—are on the CD bundled with the Tungsten T, but come pre-installed on the T2.

Though the Tungsten T is multimedia-capable, it does not have any applications for music or video playback. This is remedied in the T2, in the form of the RealOne Mobile Player and Kinoma Player and Producer.

3D games run without hiccups. Switching between applications, and viewing images and videos is fast. The colour screen on the T is bright and evenly lit, while that of the T2 is even better, showing better colour saturation. The speaker in front means that unlike the Zire 71, sound isn't muffled. The internal lithium polymer 900 mAH battery on the T gave us a good two hours and 37 minutes, while the T2 lasted for one hour and 55 minutes before dying out.

With features such as voice memo, Bluetooth, sliding design and multimedia capabilities, the T and T2 have a lot to offer. However, if you are a corporate executive and already own a Tungsten T, don't consider upgrading to the T2.

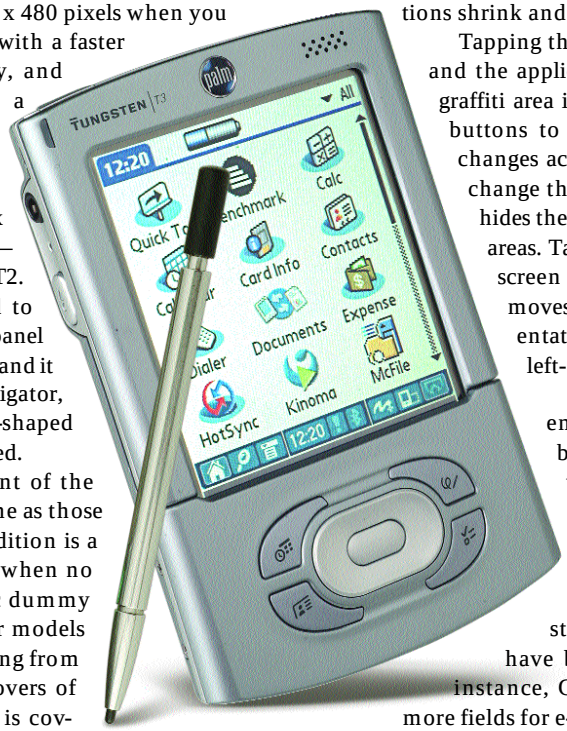


\+ Compact size
Price: Tungsten T2: Rs 21,999, Tungsten T: NA

Palm Tungsten T2	C+
Performance	
Features	
Ergonomics	
Value for money	

Palm Tungsten T3

The top-of-the-line handheld in the Tungsten T series—the Tungsten T3—features the same sliding design found in its predecessors. It betters the older models with a display that stretches automatically to 320 x 480 pixels when you open the slider. Couple that with a faster processor and more memory, and the T3 certainly becomes a package for power users.



Encased in a brushed aluminium body, the T3 weighs 155 gm and measures 4.3 x 3 x 0.66 inches when closed—slightly longer than the T and T2. The sides are slightly tapered to better fit your hand. The front panel buttons have been re-designed, and it has an oblong five-way navigator, around which four oddly-shaped application buttons are arranged.

The design and placement of the rest of the controls are the same as those of its predecessors. A new addition is a hinged door for the card slot when no card is inserted, so the plastic dummy cards that ship with the other models are no longer needed. Deviating from the plastic snap-on screen covers of the T and T2, the T3 screen is covered by a removable leather flip. The build quality is great, and you can expect years of faithful service.

The T3 is powered by an ultra-fast Intel XScale 400 MHz (PXA 255) CPU, and has 64 MB of in-built memory, 52 MB of which is available. Other features included are voice recording, Bluetooth and media playback. But the best is yet to come: Though it runs the same OS as the T2-v5.2.1, the T3's stretch display and virtual graffiti area adds a dimension to the user experience.

Close the slider, and you'll see the 320 x 320 screen with a taskbar at the bottom. Open it and the display stretches automatically to 320 x 480—the taskbar still at the bottom. The applications shrink and expand when you close or open the slider.

Tapping the 'expand' button displays the virtual graffiti area and the application icons. The main advantage of the virtual graffiti area is that you can remap any of the four silkscreen buttons to any application of your choice, and the icon changes accordingly. Also, the Preferences module lets you change the view to a virtual keyboard, or a wide mode that hides the buttons at the side and provides dedicated writing areas. Tap the rotate button on the task bar to rotate the screen 180 degrees to landscape mode. The taskbar moves, and the five-way navigator, too, changes its orientation automatically. You can set rotation for either left- or right-handed use in Preferences.

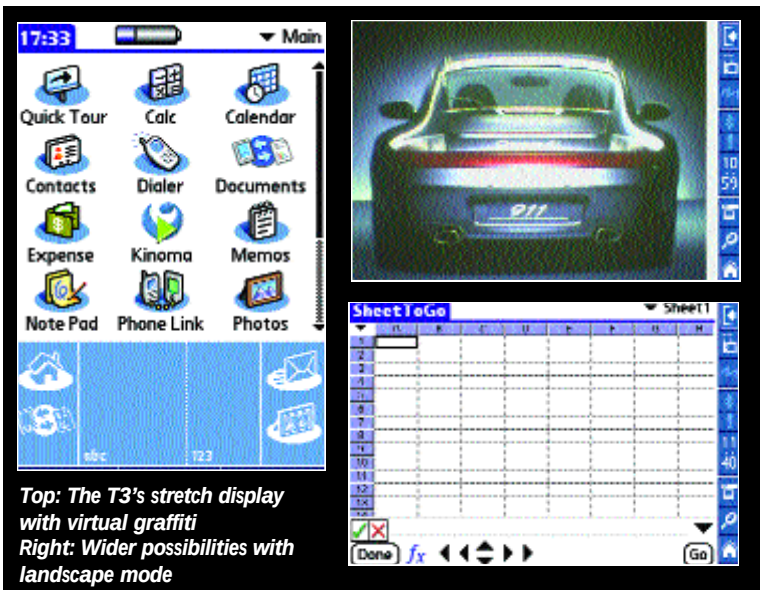
Apart from standard applications such as Calendar, Contacts, Tasks and Voice Memo, you get a bunch of useful applications such as Documents to Go, VersaMail, Dialer, SMS, Palm Photos, RealOne Mobile Player and Kinoma Player, Adobe Reader, Palm Reader, BlueBoard, BlueChat, Java and Palm Web Pro browser are included on the CD. This may seem like a standard line-up, but quite a few enhancements have been made to the applications in the T3. For instance, Contacts now support multiple addresses, and more fields for e-mail addresses, instant messenger accounts and Web sites for each entry.

The 4 KB limit for memos has now been increased to 32 KB. An Agenda view in the calendar displays appointments, tasks due and e-mail. Documents To Go v6—the latest—supports native MS-Word and Excel formats, so no conversion is necessary.

Bluetooth features also have some enhancements: you can pick a Bluetooth device from an existing list, or from your trusted devices, instead of searching for a device to pair with.

In terms of usage and performance, the T3 is great to run heavy applications such as 3D games and movie clips. The fast processor makes short work of whatever you throw at it. Viewing applications in landscape mode is a treat—especially reading eBooks, working on spreadsheets and viewing photos. The power switch on the top lacks depth, and you need to press it a little hard. Apart from that, the ergonomics are excellent. The 900 mAH battery gave us an hour and 55 minutes of continuous playback in Kinoma.

Overall, the T3 is a PDA power user's dream, and is a scorcher both in terms of raw power and features. The high price tag may deter quite a few prospective buyers, though.



Top: The T3's stretch display with virtual graffiti
Right: Wider possibilities with landscape mode

+ Stretch display and landscape mode view
- Low battery life
Price: Rs 26,499

Palm Tungsten T3	C+
Performance	▶▶▶▶▶
Features	▶▶▶▶▶
Ergonomics	▶▶▶▶▶
Value for money	▶▶▶▶▶

Palm Tungsten W

The Tungsten W is a PDA-phone combination device with a full-fledged QWERTY keyboard. Running Palm OS 4.1.1, it has a full-sized stylus for operating the applications installed.

Measuring 4.8 x 3.1 x 0.7 inches and weighing 181 gm, the steel blue-coloured device is quite bulky. The facia has the keyboard, the five-way navigator flanked by two application buttons on either side, and the power button. The top has a headset jack and an IR port, while a silo on the right houses the stylus.

The expansion card slot is on the right-hand side, contrary to other Palm handhelds, which house them on the top. The SIM card is inserted into a slot at the rear. The screen is covered by a leather flip cover that has a window to show who's calling.

Powered by the Motorola Dragonball VZ 33 MHz, the Tungsten W features 16 MB of internal memory, with 14.8 MB available to the user, and a 320 x 320 16-bit colour TFT screen. The tri-band GSM phone, with GPRS support, is useful for the global traveller.

There is no integrated speaker, and the only way to use the phone is to connect the hands-free headset. A button on the headset lets you switch to the phone application at any point, and answer calls. Press and hold the button to hang up.

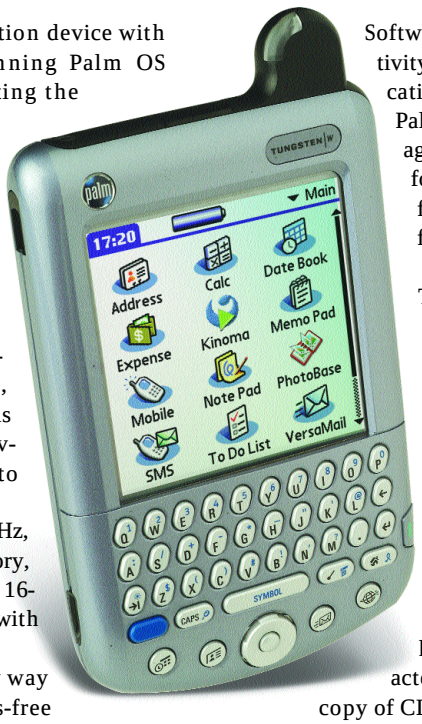
The device supports six profiles, and you can customise settings for each, including volume, vibrate mode and ringtones, and even divert calls to another number. The keyboard replaces the silkscreen area. The main keys are aligned in three rows. The fourth row has a blue function key, Shift/Caps Lock, spacebar, shortcut and Home keys. The Home key provides single press access to the 'home' applications. You can re-map each key as required.

The antenna's notification LED blinks green to show when the mobile is still within signal range, and red when it's not. The LED also indicates new messages, missed calls, alarms and battery status. In terms of connectivity, only IR is available—no Bluetooth. Application installation and PC synchronisation is accomplished through the bundled Palm Desktop software and the USB cradle using the Palm Universal Connector.



Reading and editing documents using Documents To Go on the Tungsten W

The Tungsten W has SMS, Mobile Dialer and a VersaMail 2.0 e-mail client pre-installed, apart from standard applications such as Date Book, Calculator, Memo Pad, To Do, etc.; SIM Manager, Expense and Web-clipping support are installed on first sync. The Software Essentials CD includes several productivity, entertainment and communications applications—Documents To Go, WorldMate, Jot, Palm Reader and ArcSoft PhotoBase. A call-management software called Mobile Dialer allows for caller ID, conference calls, call waiting, call forwarding, call logs, speed dialling, call profiles and dialling from your contacts list.



Performance-wise, the CPU is sluggish. There is a noticeable difference in responsiveness, especially when playing games and trying to switch between applications. The keyboard design and button placement is quite ergonomic, and a novice will have no problems using the device.

The pre-installed keyboard tutorial trains a new user to enter text, numbers and symbols. However, the keys are not backlit, so using the keyboard in the dark is a problem. The keyboard also lacks the directional arrows, and the five-way navigation key can't be used to scroll through text characters. As the Tungsten W lacks a Graffiti area, a copy of CIC's Jot is included on the CD. Jot allows you to write directly on the screen, which takes some getting used to.

You can switch the screen backlight on or off by pressing and holding the power button for two seconds. The dialler application has large onscreen buttons, so you can dial, answer or reject calls with your fingers instead of the stylus. The lack of a physical switch to access silent mode is quite inconvenient.

As with other smartphones such as the Treo 180, SIM integration is poor. Though you can use the SIM Manager to read SIM contacts and copy them to the phone, or even dial directly off the SIM using the mobile application, reading the contacts takes a fair bit of time. You need to copy the SIM contacts to the device to be able to use telephony and messaging properly.



The Mobile application on the Tungsten W lets you dial using your fingertips

With the phone off, the internal 1500 mAH lithium polymer battery lasted a whopping 12 hours and 47 minutes. With the phone switched on, you get about three days with normal PDA and phone usage.

Lack of an integrated speaker and microphone makes the Tungsten W more suitable for those who want to use it mainly for its PDA functionality and wireless data access, and not as a replacement for a cellphone. The slow CPU and lack of media playback features also need to be considered if you're thinking of acquiring a Tungsten W. However, with support for tri-band GSM, GPRS, an integrated keyboard and great battery life, the Tungsten W holds a lot of promise for globe-trotting executives.

\+ Integrated keyboard, good battery life
\- Slow CPU, lack of media playback
Price: Rs 21,999

Palm Tungsten W	C+
Performance	
Features	
Ergonomics	
Value for money	

Sweets for your Sweet

First off are cases that help you protect your device. These range from the necessary, to the superfluous: opt for just a hard plastic but stylish case, or a sleek Italian-crafted leather case for a touch of class. The leather case featured here, for the Tungsten T and T2 models, also has space for the expansion cards, and for visiting and credit cards.



Other essential accessories, ranging from styli to screen protectors, keyboards to memory cards, modem kits to power kits, are also available. Many are not comfortable using the onscreen keyboard, and writing with the stylus may not be their forte. Help is at hand: external keyboards are available. These include both wireless and connected keyboards. Wireless keyboards connect via infra-red, and are foldable.

Other accessories include memory cards, which are, by themselves, a necessity. If you want to play MP3s off your Palm, you'll need a memory expansion card, since MP3s cannot play from internal memory. Plus, once you begin to use your Palm to maximum advantage, you're going to need more storage. And talking about expansion cards, it's not limited to just a memory card.



External keyboards can really speed up the way you use your PDA

You also have a PalmPak Language Translator expansion card, which can let you *communiquer* with your French counterpart. A Bluetooth SD card is also available for models with a SD slot. However, this will not work with models running Palm OS 5.x.

In other, non work-related accessories, a PalmOne PalmPak Games Card is available for when you're stuck in traffic or are waiting for a flight. And if playing games is not your style, you can catch up with some reading with the PalmOne PalmPak eBook Series cards, which are a set of e-books ranging from Personal Finance to Mystery.

Other accessories include an MP3 audio kit and a Palm Modem connectivity kit that let you connect to the Net. And when you just can't afford to run out of power, the PalmOne Power To Go clip will definitely come in handy.

SCORE BOARD

CATEGORY	PDAs						
Brand	Palm	Palm	Palm	Palm	Palm	Palm	Palm
Model	Zire 21	Zire 71	Tungsten E	Tungsten T	Tungsten T2	Tungsten T3	Tungsten W
FEATURES (55%)							
Operating System	Palm OS 5.2.1	Palm OS 5.2.1	Palm OS 5.2.1	Palm OS 5.0	Palm OS 5.2.1	Palm OS 5.2.1	Palm OS 4.1.1
Size (H x W x D) (inches)	4.4 x 2.9 x 0.6	4.5 x 2.9 x 0.7	4.5 x 3.1 x 0.5	4 x 3 x 0.6	4 x 3 x 0.6	4.3 x 3 x 0.66	4.8 x 3.1 x 0.7
Weight (gms)	108	150	130	159	159	156	181
CPU Speed (MHz)	126	144	126	144	144	400	33
CPU Type	Texas Instruments OMAP311	Texas Instruments OMAP310	Texas Instruments OMAP311	Texas Instruments OMAP1510	Texas Instruments OMAP1510	Intel XScale PXA255	Motorola Dragonball VZ
In-built Memory / Available to User (MB)	8 / 7.2	16 / 13	32 / 28.3	16 / 14	32 / 29.5	64 / 52	16 / 14.8
Screen							
Colours / Resolution (Pixels)	4-bit / 160 x 160	16-bit / 320 x 320	16-bit / 320 x 320	16-bit / 320 x 320	16-bit / 320 x 320	16-bit / 320 x 480	16-bit / 320 x 320
Type	Reflective	Transreflective	Transreflective	Reflective	Transreflective	Transreflective	Reflective
SD/MMC Card Expansion Slot	N	Y	Y	Y	Y	Y	Y
Wireless Connectivity	Infra-red	Infra-red	Infra-red	Infrared, Bluetooth	Infra-red, Bluetooth	Infrared, Bluetooth	Infrared, GPRS/GSM
Battery Type / Rating	Li-Polymer/840 mAH	Li-Polymer/900 mAH	Li-Polymer/840 mAH	Li-Polymer/900 mAH	Li-Polymer/900 mAH	Li-Polymer/900 mAH	Li-Polymer/1500 mAH
Speaker / Headphone Jack	N / N	Y / Y	Y / Y	Y / Y	Y / Y	Y / Y	N / Y
Media Playback	N	Y	Y	Y	Y	Y	N
Special Features	NA	Integrated Camera	NA	Voice Recorder	Voice Recorder	Voice Recorder	Mobile Phone, Integrated Keyboard
PERFORMANCE (15%)							
Benchmark	223	249	215	253	255	539	156
Pilotmark							
Write 1 MB (ms)	190	200	190	170	170	90	290
Read 1 MB (ms)	210	210	220	180	180	100	310
Copy 1 MB (ms)	250	230	260	220	230	130	480
Speedy 3.3 Relative Timing (ms)	586	542	500	549	514	1500	140
Battery Life (15%)	11 hr 7 min	3 hr 14 min	2 hr 47 min	2 hr 37 min	1 hr 55 min	1 hr 55 min	12 hr 47 min
Ergonomics (Scale of 5) (15%)	3	3.5	3.5	4	4	4	3.5
OVERALL SCORE							
Overall Scores							
Features (out of 55)	11.5	34	24	29.5	32	35	29.5
Performance (out of 15)	5.54	5.64	5.26	6.11	6.00	12.20	3.13
Battery Life (out of 15)	10.87	3.16	2.72	2.56	1.87	1.87	12.50
Ergonomics (out of 15)	9.00	10.50	10.50	12.00	12.00	12.00	10.50
Overall (out of 100)	36.91	53.30	42.48	50.17	51.87	61.07	55.63
Value For Money	5.09	2.67	3.03	NA	2.36	2.30	2.53
Price (Rs)	7,249	19,999	13,999	NA	21,999	26,499	21,999
Grade	A-	B-	B-	NA	C+	C+	C+

Contact: Tech Pacific Fax: 022-55960101, E-mail: manishl@techpacindia.com, Web site: www.palmone.com, Phone: 022-55960303



Mahesh Benkar



Spice up your IE

Did we hear you say that Internet Explorer has no features? With a few plug-ins, it can rival the best

Internet Explorer (IE) may be the most popular, but it's also the most basic of browsers. Just look at Opera or Mozilla—IE lacks pop-up blockers, tabbed browsing and numerous other tiny details that make searching easier.

The good news is that it supports third-party extensions, so you can get most of these missing features installed. We divided all available add-ons into nine different categories—based on the function they perform—and looked for the best in each category.

Remember, if you want to install these add-ons, you need to first start IE, go to ***Tools > Options > Advanced*** and check the Enable Third Party Browser extensions Meanwhile, explore the following add-ons that can spice up your explorer.

UPENDRA SINGHAI
upendra_singhai@thinkdigit.com

Add-on Management

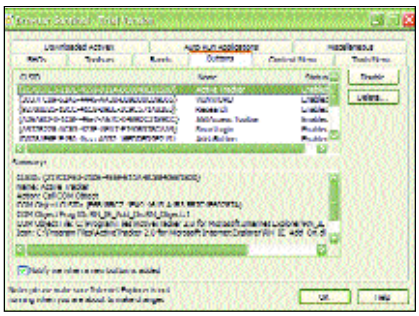
Browser Sentinel

For total control over all installed third-party extensions, you need a program that tells you what's installed where, and monitors new installations too. Presenting...the Browser Sentinel...

Use its interface to view extensions installed in different categories—Browser Helper Objects (BHOs), toolbars, bands, buttons, context menu, tools menu and ActiveX components. It also lets you manage the programs that start with Windows. If you're going to try out the add-ons we have discussed here, install Browser Sentinel first!

Get it on the Mindware CD, or download it from ***http://www.unhsolutions.net/Browser-Sentinel***.

Note that Windows XP SP 2 will have all the features of Browser Sentinel incorporated into IE *(See 'Pack 2 The Brim', Page 87)*.



Pop-Up Blocker

EMS Free Surfer mk II



Pop-up advertisements are undoubtedly the worst irritant. They are created using various techniques, and a good pop up blocker should be able to stop them all. It should also allow the pop-ups you need, be light on memory and be extremely customisable and controllable.

We tested quite a few blockers before deciding on EMS Free Surfer mk II. Some other popular pop-up blockers are Pop-Up Stopper Companion (available at ***www.panicware.com***), and the Google Search toolbar's pop-up blocker.

EMS Free Surfer mk II has two modes—Natural and Strict. Natural mode is the one you use most. In this mode, pop-ups are blocked, but requested windows are opened. In strict mode, no other window opens. It also includes few other features such as a plug-in to cleaning browser caches, home page lock, etc.

EMS Free Surfer mk II blocked unwanted pop-ups, and allowed all legitimate pop-ups. But here comes the best bit, it's a free download from ***http://www.emsproject.com/FS***, or you can just pop our Mindware CD into your CD drive. If you want to test how good your pop-up blocker is, log on to ***www.popuptest.com***.

Again, note that Windows XP SP2 has included a pop-up blocker for IE. *See page 87 for details.*

Developer Tools

IE Booster 2



This add-on is a Web page analyser meant for Web site developers.It adds a toolbar to your browser. Analyse a Web page using its buttons. This gives you information about the source, links, style sheets, frames, etc. It has a collection of online tools—think Google site search, W3C validation, traceroute, ping, search engine checker, etc. It has a button to resize the IE window, and one to zoom in and out of a Web page—actual zoom, not just change font sizes.

It adds three buttons to the standard IE toolbar, including the HTML Detective and an editor to edit the context menu. In short, it's a must-have for those who want to understand how Web pages are built. We've included it on our Mindware CD. Go to ***http://www.paessler.com/iebooster*** to learn more about it. Also check out IESizer ***(http://iebars.com/).***

Form Fillers

RoboForm 5.6.4

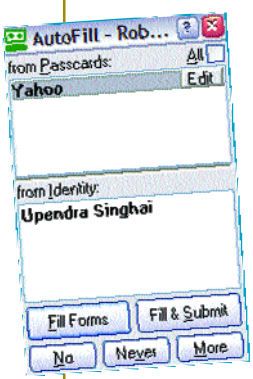
No Net surfer should be without one! Why fill the same fake details into hundreds of different forms, when you can get a program to lie for you?

RoboForm is a password manager and form-filler that's here to make your life easier.

Just install it, fill in your details when the setup prompts you to, and you're set to fill forms with a mouse-click.

You can have multiple identities, for each member of your family or for each of your personas. It can even handle radio buttons and check marks, and stores your passwords with triple DES encryption.

The tool is accessible from the browser toolbar, the context menu, a tray icon, or a desktop shortcut. Get it from ***www.roboform.com.***



You can also refer to the October 2003 issue of *Digit* for the Quickstart article, *'What's in a password'* on Roboform 5.6.4.

You could also take a look at Dejasurf ***(www.dejasurf.com)*** as an alternative.

Productivity tools

ieSpell

Some of us just can't speel. Oops, spell! Thank God for Word! But what do you do when you need a spell checker while surfing the Net?

Though many Web-mail services offer a spell checker, they're just a waste of bandwidth—you have to click on a button, submit your mail to the e-mail service's spell checker, and wait for it to send corrections back. ieSpell does away with all that and checks spellings at the click of a button.

Activate it from the tools menu, the toolbar, or the context menu. The dialog box is identical to MS Word. Choose between UK, US and Canadian English. Add new words, and install new dictionaries too.

It also has a link to the Merriam-Webster online dictionary. Overall, a useful tool available at ***www.iespell.com***.

Other similar tools available include Hot Lingo ***(www.hotlingo.com)*** and Wordz Toolbar ***(www.socketsoftware.com)***.

Toolbars

Search Toolbar

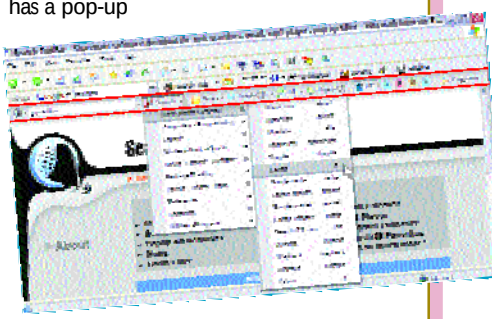
Many of us prefer to use two or three search engines to get better results. What you really need is a tool that gathers results from all your favourite search engines.

Search Toolbar is the perfect solution. You can search over 70 Web sites, and can customise it even further. The different search engines are arranged in categories, so navigation is not a problem. It also has keyword search to speed up your searchs.

For example, to search for 'Jasubhai' with Google, all you need to do is enter ***'g Jasubhai'***. This functionality can also be achieved in IE by using Microsoft's TweakUI Utility or some registry tweaks, but you will need to know the URLs of the Web sites and the way the search string is passed to them.

This tool is useful as it gives you access to many search engines without knowing all these details.

It can also check your e-mail, and show you how many new mails you've received; it has a pop-up



blocker and form filler. It also contains a WinAmp control button, and you can add more for other applications. You can use a really simple wizard or the standard options dialog to configure this tool. Get it from ***www.searchtoolbar.com.*** Another popular toolbar is Groowe Search Toolbar ***(www.groowe.com).***

Privacy

IE Privacy Keeper

Guard your temporary files and browsing history with small, free and effective IE Privacy Keeper. Use it to clean out those files, URLs, auto-complete forms and cookies. You can even clean up the mess you leave Windows—in the temporary files, Recycle Bin, Open/Save history, Recent Documents and even the Recently Opened files list.

Set it to erase tracks when you close an IE window, or when Windows starts or shuts down. It's available at ***http://www.unhsolutions.com/IE.***

Another option is Webroot Window Washer ***(www.webroot.com).***

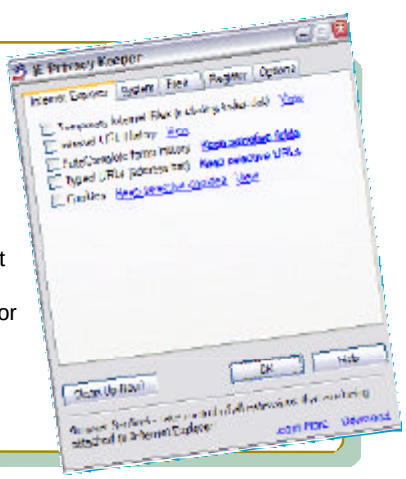


Image Grabber
1ClickPicGrabber 2.01

Oh! What a beautiful scene. Look there's more below, wait there's about 50 amazing pictures on this Web site. Oh well, ***Right-click > Save As > [Enter], Right-click > Save As > [Enter], Right-click > Save As > [Enter], Right-click > Save As > [Enter]...***

That's one way to go. The smarter thing to do is install 1ClickPicGrabber. It adds a button to IE that lets you download all images on a Web page, images that are linked to from that page, and even movies and other files, with just a single click. The files copy in the background to folders.

You can filter offensive images by using its inbuilt 'Skin Filter'. Just be careful you don't click that button when on Google—that would be like trying to download the Internet! Get it from our Mindware CD, or from ***www.1cpg.com.***

SmartGrabber 3.1 ***(http://www.hibrosoft.com/smartgrabber.php)*** is another option to look at.



Miscellaneous

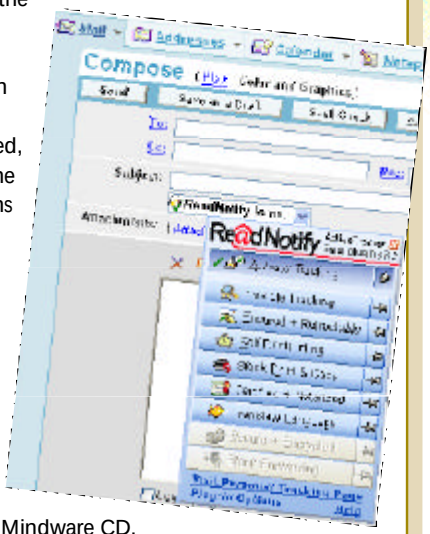
ActiveTracker Email Plug-in

If you use Yahoo! and Hotmail, and really miss the 'Read Receipt' feature of Outlook, don't fret. ActiveTracker works with Yahoo! and Hotmail.

Once you've installed it, you can track when the recipient read your e-mail, where he or she geographically was when the e-mail was opened, how long they took to read it, did they print the e-mail, was it forwarded, etc. These notifications are sent to you in a detailed e-mail.

But that's not all...you can also send self destructing mail. Mission Impossible anyone? Once the e-mail is opened, it's only readable for a specified time. This is done by sending a link to the reader, while the e-mail sits on the server. Once a reader visits the link, the link becomes inactive after the specified time.

Unfortunately, this is a trial software, valid for 25 e-mails or 15 days, whichever comes first. You can try it out by installing it from our Mindware CD, or go to ***www.readnotify.com***, to learn more.



UCmore

You're looking to buy that great Sony TV you saw somewhere, but now you can't find the Web site...let UCmore help you. It's great: install, navigate to ***www.sony.com*** and UCmore immediately uses a search engine to display buttons called 'Consumer Electronics', 'Communication', 'Home theatre', etc., on its toolbar.



This is much better than search engines, as it only displays related information—all sorted in groups. Click on a button, and get a drop-down menu showing you selected Web sites. A brief description of each site is shown as a tool tip.

We suggest you try it immediately: log on to ***www.ucmore.com*** and download it.

Other Browsers

Plug-in to Another

Internet Explorer has long been the most popular browser, but it's simple, missing a lot of features. This is why most plug-ins are developed for IE. However, there are tools that will improve even the experience that Mozilla Firefox and Opera have to offer.

Opsed, or Opera Search.ini Editor ***(http://starzaki.eu.org/~hclan/operapl/en/),*** is a useful tool for easy customisation of the search engines used by Opera. It is basically a GUI interface to edit Opera's search.ini file, which is otherwise difficult to edit. Other plug-ins for Opera can be found at ***www.opera.com/docs/plugins.***

For Mozilla Firefox, there are over 150 plug-ins listed at ***http://texturizer.net/firefox/extensions/alpha.html.*** Some useful plug-ins listed here are Adblock (block images or other elements on a page), Scribe (lets you to save the forms you fill), Bookmarks Synchronizer (allows you to save your bookmarks to an FTP site), Nuke Anything (removes any object from the Web page layout) and PNH Developers' Toolbar (allows you to analyse a Web page).

If you use more than one browser, or just have too many bookmarks to be able to find a site that you need to re-visit, Powermarks ***(http://www.kaylon.com/power.html)*** will prove to be a useful tool. It is a bookmark management tool that works with Opera, Mozilla and IE and offers a simple and very effective search-based organisation of your cherished bits of the Web.

The A-List

The best products in different hardware and software categories

Products that topped our performance tests

CPU

AMD Athlon64 FX-51

+ Great performance with multi-media applications
- Expensive

Contact: Tech Pacific
Phone: 022-55960101
E-mail: pratik.chube@techpacindia.com
Price: Rs 41,000

Motherboard

MSI 875P Neo

+ Terrific performance and equally good features
- Bad component layout

Contact: Cyberstar
Phone: 080-2276986
E-mail: narend@cyberstarin.net
Price: Rs 35,500

Primary Storage

Maxtor 250 GB MaxLine Plus II

+ Tons of space
- Gets heated

Contact: Cyberstar
Phone: 011-6438216
E-mail: yogi@maxtor.com
Price: Rs 19,500

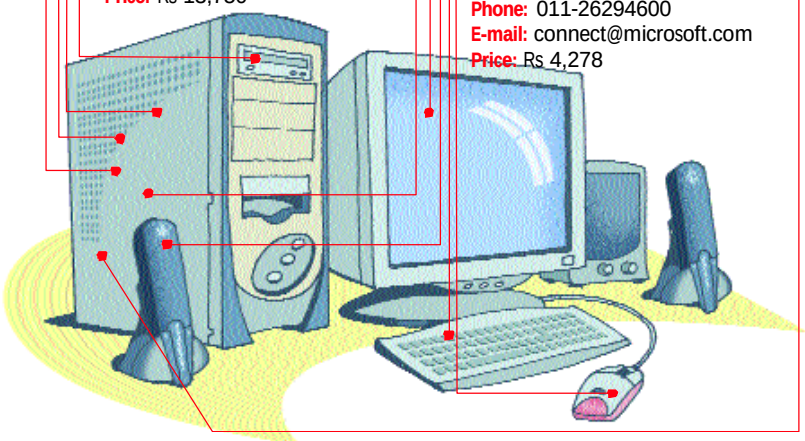
Secondary Storage

DVD-Writer

LiteOn LDW-811S DVD-Writer

+ Fast write speeds
- Cannot write on dual-layered media

Contact: Mediatech India
Phone: 022-56396696
E-mail: sales@mediatechindia.com
Price: Rs 13,750



Graphics Card

Gainward GeForce FX 5950 Golden Sample

+ Extremely good performance
- Expensive

Contact: Mediatech India
Phone: 022-56396696
E-mail: sales@mediatechindia.com
Price: Rs 31,475

Display

LCD Monitor

NEW

Samsung SyncMaster 173P

+ Very elegant looks, Landscape and Portrait modes
- A bit heavy

Contact: Samsung India Electronics
Phone: 011-51511234
E-mail: marketing@samsungindia.com
Price: Rs 47,500

Speakers

Creative Inspire 5700D

+ Crystal clear sound reproduction
- Will not be able to shake the room

Contact: Creative Technology Ltd
Phone: 9820357713
E-mail: rajshekhar_bhatt@ctl.creative.com
Price: Rs 23,999

Input Devices

Microsoft Natural Multimedia Keyboard

+ Great quality and ergonomics
- Takes time to get accustomed to new key layout

Contact: Microsoft Corporation
Phone: 011-26294600
E-mail: connect@microsoft.com
Price: Rs 1,498

Microsoft Wireless IntelliMouse Explorer

+ Optical Mouse, USB interface
- Expensive

Contact: Microsoft Corporation
Phone: 011-26294600
E-mail: connect@microsoft.com
Price: Rs 4,278

Sound Card

Creative SoundBlaster Audigy 2 Platinum

+ 6.1-channel output
- Expensive

Contact: Creative Technology Ltd
Phone: 9820357713
E-mail: rajshekhar_bhatt@ctl.creative.com
Price: Rs 14,199

Laptop

IBM T40

+ Great design, excellent performance
- Expensive

Contact: IBM India Ltd
Phone: 080 2063199
E-mail: sanmenon@in.ibm.com
Price: Rs 1,53,366

Branded PC

HCL Beanstalk 4658

+ Great package
- None

Contact: HCL Infosystems Ltd
Phone: 0120-2520977
E-mail: raman@hclinsys.com
Price: Rs 51,490

Multi-functional Device

Xerox PE16 All-In-One

+ Good fax features, compact design
- Below par scan and copy quality

Contact: Xerox Modicorp Ltd
Phone: 0124-2561930/ 940
E-mail: kuldeep.malhotra@ind.xerox.com
Price: Rs 40,000

Laser Printer

Canon LBP3200

+ Compact and light; fast 17 ppm text printing speed
- Flimsy paper tray mechanism

Contact: Canon India Ltd
Phone: 011-26806572
E-mail: rajeev.singh@canon.co.in
Price: Rs 13,995 plus taxes

Inkjet Printer

Canon i560

+ Classy printing speeds
- None

Contact: Canon India Ltd
Phone: 011-26806572
E-mail: rajeev.singh@canon.co.in
Price: Rs 9,995

PDA

NEW

Palm Tungsten T3

+ Stretch Display
- Expensive

Contact: Tech Pacific
Phone: 022-55960303
E-mail: manishl@techpacindia.com
Price: Rs 26,499

Mobile Phone

NEW

Sony Ericsson P900

+ Good integration of phone and PDA features
- Expensive

Contact: Sony Ericsson
Phone: 0124-2560808
E-mail: dhiraj.soni@sonyericsson.com
Price: Rs 40,000

Digital Camera

Canon IXUS 400

+ Cerabrite body, better buttons layout, wide shutter speed range
- Ultra compact body hampers handling

Contact: Canon India Pvt Ltd
Phone: 011-26806572
E-mail: shyam@canon.co.in
Price: Rs 49,995

MP3 Player

Apple iPod

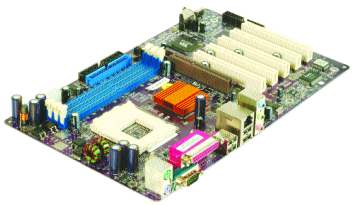
+ Hard-drive based, FireWire cable bundled, line-out socket
- Very expensive

Contact: Apple Computer International Private Limited
Phone: 080-25550575/ 73
E-mail: indiainfo@asia.apple.com
Price: 30 GB-Rs 41,000



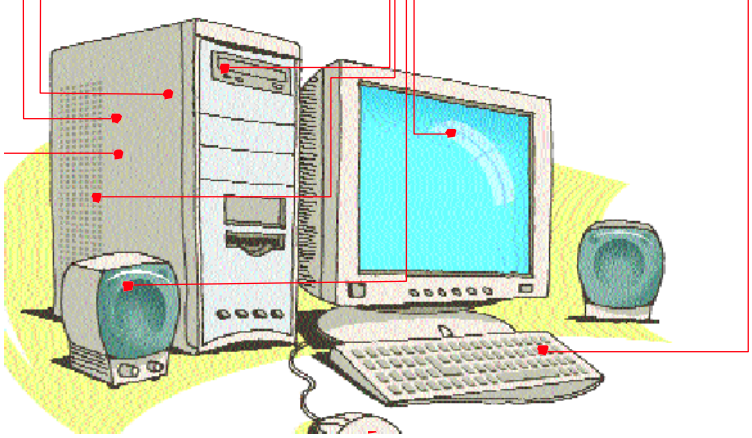
Products that are the best value buy

CPU
AMD 2400+
+ Sufficient power for normal desktop use
- Cumbersome installation
Contact: Tech Pacific
Phone: 022-55960101
E-mail: pratik.chube@techpacindia.com
Price: Rs 4,100



Motherboard
Krypton NF2400U
+ Good features, impressive performance
- Lacks onboard video
Contact: Priya Ltd
Phone: 022-56663100
E-mail: priyabom@priyagroup.com
Price: Rs 3,550

Primary Storage
Samsung SV1203N 120 GB
+ Noise Guard and ImpacGuard
- 5400-rpm drive
Contact: Samsung Electronics India Information Telecommunication India Pvt. Ltd
Phone: 011-515111234
E-mail: marketing@samsungindia.com
Price: Rs 7,200





Secondary Storage
CD-Writer
Benq CRW5224W
+ Cheap
- Data cable not bundled
Contact: BenQ India Pvt Ltd
Phone: 022-25705231
E-mail: salesenquiryin@benq.com
Price: Rs 2,000



Graphics Card
Ennyah GeForce FX 5700
+ DirectX 9.0 compatible
- Very expensive
Contact: Great World Tech Pvt Ltd
Phone: 022-23892828
E-mail: sales@gtechworld.com
Price: Rs 8,500

Speakers
Frontech JIL-1870
+ Good sound at an affordable price
- Cannot handle high volume
Contact: Jupiter International
Phone: 022-22001211
E-mail: frontech@bom5.vsnl.net.in
Price: Rs 1,500

Display
CRT Monitor
Philips 109E5
+ Good geometry results, good colour purity
- Average results in fine matrix
Contact: Philips India Ltd
Phone: 022-56912325
E-mail: PCP.India.Info@philips.com
Price: Rs 11,500

Input Devices
Samsung PC Keyboard
+ Unmatched value for money
- No multimedia buttons, wrist support not bundled
Contact: Samsung Asia Pvt Ltd
Phone: 022-22814886
E-mail: marketing@samsungindia.com
Price: Rs 300

Logitech Scroll Mouse
+ Ambidexterous design
Contact: Rashi Peripherals
Phone: 022-28260258/ 59
E-mail: ho@rptechindia.com
Price: Rs 450

Branded PC
HCL EzeeBee
+ Winner of Best Value and Best Performance
- Needs a better graphic card
Contact: HCL Infosystems Ltd
Phone: 0120-2520977
E-mail: raman@hclinsys.com
Price: Rs 26,500

Laptop
ACI Ethos 4
+ Good configuration for the price
- Hampered ergonomics
Contact: Allied Computer International (Asia) Pvt Ltd
Phone: 022-56943260/ 26733124/ 56407000
E-mail: sales@aci-asia.com
Price: Rs 44,990

Multi-function Devices
HP Officejet 4110 All-in-one
+ Very fast printing speed
- Lacks a flatbed scanner
Contact: HP India Ltd
Phone: 011-26826000
E-mail: seema.dawar@hp.com
Price: Rs 8,999

Laser Printer
Samsung ML-1510
+ Good image quality
- Slow print speed for combo document
Contact: Samsung Electronics India Information and Telecommunication Ltd
Phone: 011-51511234
E-mail: farrukh@samsungindia.com
Price: Rs 10,990

Inkjet Printer
HP Deskjet 3550
+ Good photo printing capability, quite cheap
- High cost per page
Contact: HP India Ltd
Phone: 011-26826000
E-mail: ashwini-k_aggarwal@hp.com
Price: Rs 2,999

PDA
Palm Zire 21
+ Affordable, good battery life
- No Palm Universal Connector, no backlight, no expansion slots
Contact: Tech Pacific
Phone: 022-55960303
E-mail: manishl@techpacindia.com
Price: Rs 7,249

Digital Camera
Kodak DX6340
+ 3.1 megapixel camera with 4X optical zoom
- Only 16 MB memory
Contact: Neoteric Infomatique
Phone: 022-24172600
E-mail: rajeev@neoteric-info.com
Price: Rs 18,900

Mobile Phone
Sony Ericsson T200
+ Light-weight, perfect grip, WAP 1.2.1 browser and 43.2 Kpbs GPRS, PIM features
- Keys are hard and noisy, unusual socket for the charger
Contact: Sony Ericsson Mobile Communications International
Phone: 011-26180808
E-mail: sudhin.mathur@sonyericsson.com
Price: Rs 5,900

MP3 Player
Ennyah Digisound II DS601
+ Fast data transfer, feature-rich
Contact: Great World Tech Pvt Ltd
Phone: 022-23892828
E-mail: sales@gtechworld.com
Price: Rs 6,000 (approx)

Bazaar

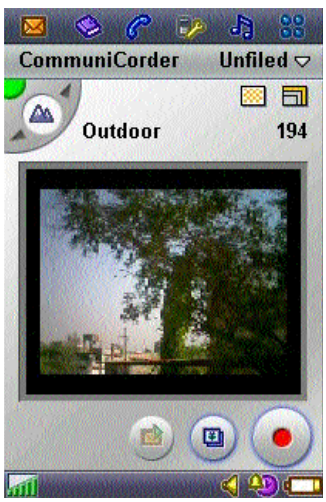
We test the latest and the best hardware and software products available in the market

Sony Ericsson P900

How do you replicate a class act, and then justify the 'new and improved' tag? If ever there was an example that management students can learn from, it's the Sony Ericsson P900 phone-PDA combo. It looks more professional, is smaller, lighter, less clunky and has features ideal for both business and pleasure.

The price (Rs 40,000) puts it off-limits for most of us, but with current smart-phone technology, you could hardly ask for more. The internal 16 MB memory can be boosted using the Memory Stick Duo socket—up to 128 MB.

The P900 offers great functionality as a regular phone, with excellent voice clarity even in areas with low network coverage. The phone's bulk may prevent



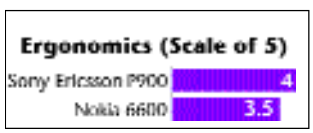
Capturing stills or videos on the P900 is simple



those with small hands to hold it, but it must be mentioned that the 65K touchscreen is extremely clear, and the colours are rich. In flip-open mode, the entire LCD screen comes into views, and phone is now a fully functional PDA.

Music playback is good, and though the videos (in MPEG-4 format) seem a little grainy, the pictures (stored in JPEG format) come out pretty well. But make sure the lighting conditions are good.

The integrated digital camera has a resolution of 640 x 480, 320 x 240, or 160 x 120 pixels, allowing you to choose from three types of picture quality—high, medium and low. Videos can be shot for as long as you want, limited only by the amount of free memory available. Apart from JPEG, the picture viewer supports the BMP, GIF, PNG and WBMP formats.



The device would seem a bit slow while opening some applications, and playing games is not a pleasurable experience at all. Most of all, you miss the full-screen mode, and you need the stylus and a virtual navigation pad to control game objects.

It features a voice recorder and an integrated hands-free speaker. Apart from the T9 numeric keypad and an onscreen virtual keypad, there is also CIC's JotPro that uses character recognition, *à la* Palm Graffiti, for onscreen writing using the stylus.

Connectivity and data transfer options include Bluetooth, Infra-red, GPRS and HSCSD. Surf the Web using the WAP 2.0 HTML browser. Features such as support for e-mail with attachments and a built-in viewer that can read Microsoft Word and PDF documents, let you do your work on the move.

The PIM features Tasks, a calendar with multiple views, notes, a calculator, and multiple alarms. There's an inbuilt file manager to

Price: Rs 40,000
Contact: Sony Ericsson
Phone: 0124-2560808
E-mail: dhiraj.soni@sonyericsson.com
website: www.sonyericsson.com



The applications installed resemble the Start Menu in Windows

organise stored files in the internal and external memory. The CD also includes the Opera browser.

We were able to pair the device with a desktop PC using a Bluetooth USB adaptor without any hiccups. The lithium polymer battery can last you three days with normal use of the phone, camera, multimedia and PDA features.

+ Stacked to the gills with features
– Slightly expensive

SPECIFICATIONS

Tri-band (GSM E900, 1800, 1900), Symbian OS 7.0, 115 x 57 x 24 mm (with flip), 150 gm, integrated camera, video recorder, GPRS, WAP, HSCSD

Sony Ericsson P900	B
Performance	
Features	
Ergonomics	
Value for money	

Hercules DJ Console

A DJ Console is a turntable-like device that a DJ uses for mixing tracks. Hook it up to your PC via USB, and mix MP3s you've collected over time on your hard disk.



Traditional DJ consoles consist of two decks—sources of music—and a mixing console. Here, the PC works as the music source, and the console as the mixing equipment.

Queue songs from your music collection in the order you want, and with practice, you can even become a professional DJ. However, at Rs 14,495, the Hercules DJ Console is priced slightly on the higher side. You could consider some assembled options for practice.

The console provides a range of connectors: MIDI-In/Out, Coaxial Digital In/Out, Optical In/Out and Audio In/Out with the help of a mini-stereo jack (3.5 mm) or an RCA plug. An added advantage is the 5.1 sound card that allows you to connect a five-channel speaker set.

The Mixing Console is low on desk space requirements; its compact profile tends to induce some ergonomic problems. The controls are similar to those of a traditional console, with mixer knobs, switches, etc. The mixer can also be controlled using the bundled software. Plenty of software applications are provided with the console, including Virtual DJ from Atomix Productions, Ots CD Scratch, OtsDJ Demo, Storm 2.0 DJ Edition from Storm Music Studio and DJ Console Softmapper from Hercules.

Queue up two audio streams (MP3,WMA, etc.) to be mixed on the interface, and line up the next track as well. Each stream has its individual volume, treble, bass and mid controls, play, track forward, track backward, etc; as well as the mixing options of tempo changer, pitch bend, scratching knobs, three cue points, auto beat, special DJ effects and a cross-fader, which should get any DJ going right away.

+ Unique product
- Slightly cramped work space, a tad expensive

Price: Rs 14,495
Contact: Mediatech India
Phone: 022-26361111
E-mail: info@mediatechindia.com
Website: www.mediatechindia.com

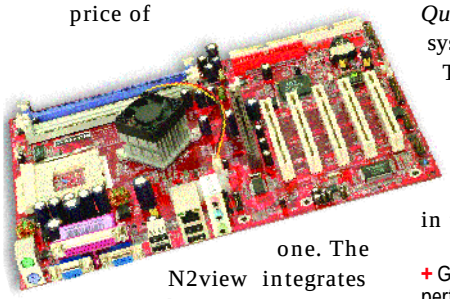
SPECIFICATIONS

MIDI-In/Out, Coaxial Digital In/Out, Optical In/Out and Audio In/Out, 5.1 sound card

Hercules DJ Console	B-
Performance	
Features	
Build quality	
Value for money	

Jetway N2view motherboard

At Rs 6,500, the Jetway N2view is the best thing to happen since cable Internet to a cyber cafe owner since you can set up two PCs at the price of



one. The N2view integrates two D-Sub monitor-outs. The board ships in with two PS/2 Y cables.

For a lark, we used the board in single-user mode, and it gave good results. The real test, however, was in the twin-user mode. We tried to simulate every possible scenario wherein the system could be used as two independent systems. In office-related work, both systems ran perfectly. Even when one system ran *Quake III*, the other ran MS Word perfectly OK. But when *Quake III* was started on both systems, the board crashed.

Thus, this motherboard is good if your work is usually restricted to office suites, Internet surfing and 2D games in two-user mode.

Price: Rs 4,900
Contact: Anirox Technologies
Phone: 022-28655282/3/4
E-mail: aniroxby.vinay@anirox.com
Web site: www.jetway.com

\+ Good features, relatively good performance
\- Doesn't support 400 MHz memory

SPECIFICATIONS

Supports AMD Athlon 3200+, DDR 333 MHz, onboard six-channel sound, supports ATA 133 and an AGP 8x slot

Jetway N2view motherboard **A-**

Performance	▲▲▲▲▲
Features	▲▲▲▲▲
Build quality	▲▲▲▲▲
Value for money	▲▲▲▲▲

	Two PCs with Jetway motherboard	Two individual PCs
Performance (out of 75)	52.13	54.12
Price	Rs 28,500	Rs 56,200
Performance/Price ratio	1.82	0.96

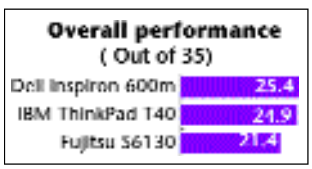
Fujitsu Lifebook S6130

At Rs 1,20,000, the Lifebook S6130 is a bit expensive, but its price is justified—the bundle is elegant, eminently portable and performs where it matters most. Built around Intel's Centrino platform, it is in the league of the top performers. It did extremely well in our productivity and business application tests. The ultra-portable form factor and 1.7 Kg add immensely to its appeal. The battery lasts for around four hours on a normal workload.

The keyboard is large enough, and the keys at the extremes fall within easy reach. There's enough space



near the touchpad for resting one's palm. The swappable combo drive can be easily removed an re-inserted.



Price: Rs 1,20,000
Contact: ACI Infocom Ltd
Phone: 022-28266031/32
Fax: 022-28250674
E-mail: desmond@aciinfo.com
Web site: www.aciinfo.com

\+ Good performance

SPECIFICATIONS:
Pentium M 1.7 GHz, 256 MB DDR RAM, 13-inch TFT display, 40GB hard drive, combo drive, Wi-Fi

Fujitsu Lifebook S6130 **B-**

Performance	▲▲▲▲▲
Features	▲▲▲▲▲
Build Quality	▲▲▲▲▲
Value for money	▲▲▲▲▲

Philips 535 Mobile Phone

Nokia and Sony Ericsson herd. It integrates the Philips sound system. The design is unusual. The hot pink with matte silver model should appeal to women, and the black one, to most young men.

Connectivity comes in the form of infra-red and GPRS. You get an integrated VGA camera with a maximum resolution of 640 x 480, and a minimum of 128 x 128. There's colour mode, quality, resolution and palmtop and they look much better. A small mirror for a self portrait is provided.

The keypad is neither good, nor bad. The keys have the right tactile feedback, and the joystick is fun to use. At times

SPECIFICATIONS

95 gm, dual band, MMS capability, 28 x 28 mm 65k colour screen, voice dialling, recording features, 32-bit polyphonic ring tones

Browsing the menu is easy with dedicated buttons. The screen is small and quite blurry. In daylight, it goes pale, but remains readable.

A unique feature is the Be DJ Mixer functionality, which lets fun.



Price: Rs 11,360
Contact: Philips India Ltd
Phone: 011–26950448/49/50
Fax: 011–51678632
E-mail: manisha.singh@philips.com
Web site: www.philips.com

\+ Good features, stand-out design
\- Relatively poor display screen

Philips 535 Mobile Phone (200) **B+**

Performance	▲▲▲▲▲
Features	▲▲▲▲▲
Build quality	▲▲▲▲▲
Value for money	▲▲▲▲▲

Brother MFC-3820CN



The Brother MFC-3820CN has card reader slots that read MemoryStick, Compact Flash, Secure Digital and Smart Media formats. As you plug the memory card in, a dialog box provides options to open the folder or print it.

The printer head produces 5 picolitre drops, while a Canon photo printer manages drops as small as 2 picolitres. Hence, the 3820CN lags far behind in image sharpness and details. However, images printed from the Compact Flash card at the best settings on glossy and inkjet paper had vivid colours and crisp details.

The combi-document print-out also returned good prints. The text printout, though, had lots of smudging all over and looked like a print from a dot-matrix printer.

The scanned image had endless banding, and details were lost. Also, it took 17 seconds to scan the preview, whereas the Epson CX3100 took just 6.25 seconds. The ADF, however scans quickly while copying.

It has a dial-pad and separate fax buttons on the front panel to straight away send/receive the fax without any help from PC.

The printer has four separate ink-cartridges (CMYK), which is good approach as it lets you change only the empty cartridges. The black cartridge costs Rs 910, where as the three-colour cartridges are priced at Rs 531 each, which is quite a competitive price.

The integration of its paper trays leaves very little, or no chance of them being damaged. In all, it's an all-round solution for the small office.

Price: Rs 27,600+ taxes
Contact: Godrej & Boyce Mfg Co Ltd
Phone: 022-55961609
E-mail: nad@godrej.com
Web Site: www.brother.com

\+ Good print quality
\- Poor scanning unit

SPECIFICATIONS

1 line x 16 character LCD Display, 16 MB memory, 20 sheets automatic document feeder, Max. 600 x 2400dpi optical resolution, USB 2.0

Brother MFC-3820CN	B
Performance	
Features	
Build Quality	
Value for money	

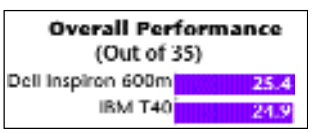
Dell Inspiron 600m



If you want a performance-oriented laptop, the Dell Inspiron 600m fits the bill. It's excellent value for money.

Performance separates it from the crowd. It beat our January 2004 comparison winner, the IBM ThinkPad T40. But higher performance means that the battery lasts only three hours.

The Inspiron 600m is based on the Centrino platform, is powered by a Pentium M 1.7 GHz, 512 MB of DDR memory, a 64 MB Radeon 9000 display card and 40 GB of hard disk space. It weighs 2.3 Kg.



The design is a perfect blend of aesthetics and practicality. Ergonomics is spot-on, and using the laptop is a pleasure. The keys are reasonably large and well-laid out. The touch pad is sensitive and accurate, but the touch pad buttons lack the feel associated with quality laptops. Overall, however, the build quality is superb.

For connectivity, the Inspiron 600m comes with built-in Wi-Fi and Ethernet as well as an optional Bluetooth adapter. Video options include one monitor D-sub and an S-Video connector.

Price: Rs 90,690
Contact: Dell Computer India Pvt Ltd
Phone: 1600-338044
Fax: 080-25586107
E-mail: HSB_Web_India@Dell.com
Web site: www.dell.com

\+ Excellent performance
\- Flimsy touch pad buttons

SPECIFICATIONS

Pentium M 1.7 GHz, 512 MB of DDR RAM, 32 MB Radeon display card, built-in Wi-Fi card, combo drive, optional Bluetooth adapter

Dell Inspiron 600m	A-
Performance	
Features	
Ease of Use	
Value for money	

Orite VC3240



The Orite VC3240 is not worth Rs 7,950. Indoor images were not of acceptable quality, and outdoor images, just about average.

Details were lost in an extreme close-up: the crystal pen stand we shot looked like a plastic stand. We couldn't get better results even though the camera features exposure compensation, four pre-defined white-balance settings and two settings for quality.

At factory settings, indoor images were dark, and had prominent red tinges in the light areas and green tinges the dark areas—neither the colours nor details were reproduced well. For usable images, you have to rely on the manual mode.

It's compact enough to fit in most palms. A nice mode dial does the switching between operational modes—manual, auto, movie and so on.

But that's all you are paying for.

\+ Good looks
\- Below-average quality images

SPECIFICATIONS

3.2 megapixel CMOS sensor, 4x digital zoom, 16 MB internal memory, ±2EV exposure, four white balance settings, 20 cm macro mode, four AAA batteries required, 2 to 10 seconds self timer, 110 gms

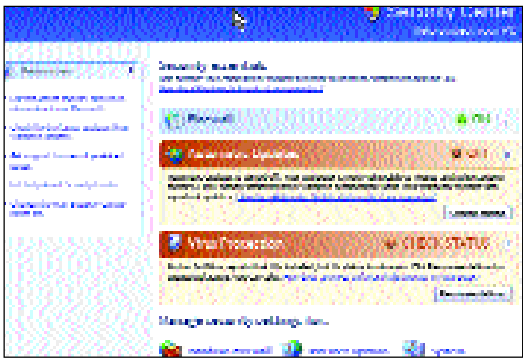
Price: Rs 7,950
Contact: Mediatech India
Phone: 022–26361111
Fax: 022–24968085
E-mail: csales@mediatechindia.com
Web site: www.orite.com.tw

Orite VC3240	C
Performance	
Features	
Ergonomics	
Value for money	

Pack-2 The Brim

We take a sneak peek at Windows XP Service Pack 2, to show you what to expect

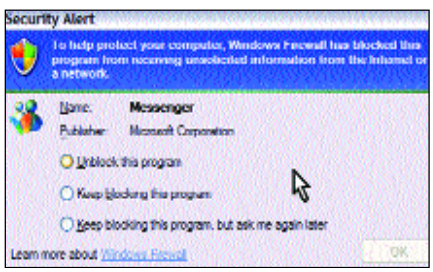
Security! That's what's on us Windows user's minds. Even Microsoft holds it as a top priority. A technical preview of Service Pack 2 (SP2) has been released Windows XP. This is downloadable from ***http://www.microsoft.com/sp2preview/***—be warned, it's a 273 MB download, and still in its beta stage. The final release is expected at the end of 2004, so the beta may have bugs; even Microsoft states, "This technical preview is unsupported and is intended for testing purposes only. Do not use in production environments."



Security Center is the master control centre for firewall, automatic updates and anti-virus

You'll be asked to enable Automatic Updates at the Welcome Screen. Both the Web interface, as well as the system interface for automatic updates has been revamped.

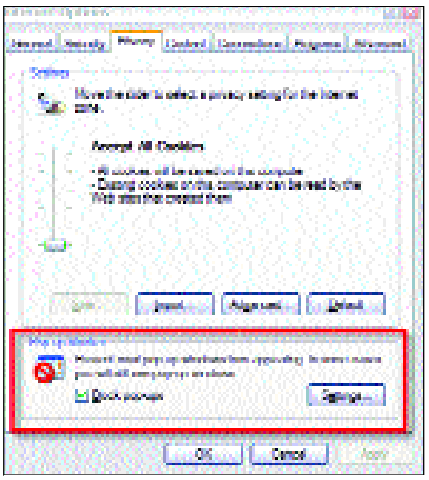
The Security Center is like a master control centre for three main aspects of your security—firewall, automatic updates and anti-virus. A red icon shows which is turned off, and you also get frequent balloon pop-ups that say, "Your computer might be at risk". SP2 was smart enough to recognise that Norton AntiVirus (NAV) was installed, but couldn't tell whether NAV was enabled or not. We couldn't even force SP2 to accept that NAV was indeed running fine.



A much improved firewall comes with SP2

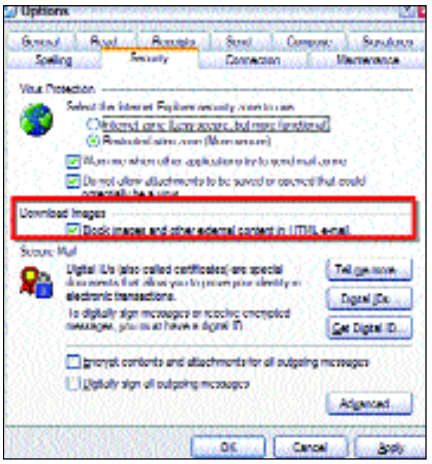
SP2's firewall is a marked improvement over the simple Internet Connection Firewall that comes with Windows XP. The new firewall is turned on automatically, has a better user interface and better application control. The Exceptions tab let's you choose programs and services that should get uninterrupted Internet access. Using the advanced tab, you can change detailed settings for Network Connections, Security Logging and Internet Control Message Protocol.

Whenever a program tries to access the Internet, a dialog pops up asking you what action it should take. However, this is very buggy: both Windows Media Player and Opera could access the Internet without being allowed to do so—it didn't detect Opera until a few days later. This is unacceptable, and will hopefully be fixed in SP2's final release.



Finally, IE users get an inbuilt pop-up blocker

To protect your memory from malicious code, Microsoft has introduced hardware-enforced Execution Protection, also known as NX. Processors that support this mechanism can prevent code execution from data pages, by marking a range of memory with an attribute, so that code is not executed from that memory. This will help prevent the very common buffer overflow-based attacks that occur in software as varied as browsers, e-mail clients and file-sharing services. Unfortunately, the only processors that currently support this are the AMD K8 and the Intel Itanium processor family—so until you upgrade your hardware, this technology is useless for you.



Outlook Express now blocks images in e-mail messages to protect your privacy

After a lot of complaints, Microsoft has finally added a pop-up blocker for IE in SP2. It was able to stop unwanted pop-ups and allow the genuine ones. SP2 also has an Add-on Manager for IE—it allows you to view, enable and disable Active X controls, browser extensions, Browser Helper Objects (BHO) and all the toolbars that are installed. Outlook Express can now block images in HTML e-mail, until you choose to display them. This also prevents spammers from validating your e-mail address and tracking when an e-mail is opened.

A lot of smaller features have also been added, such as the addition of the Bengali and Malyalam locales. SP2 also has a new command line tool called powercfg.exe, which can be used to access the Windows power policy settings (***Control Panel > Power Options***).

Though SP2 looks very promising, there's no point installing this beta release—we suggest that you wait for the final release.

Smarter than Thou

Today, mobile phones aren't bought to make calls. You're only as cool as your instrument, so buy carefully...

Watching TV the other day, I was bombarded by ads that featured state-of-the-art smartphones. Especially catchy was the Nokia 6600 and whatever came with it, including a promotion and a girlfriend. That really had me itching to go out and get one for myself. And well, it was about time I sent my Nokia 3310 to the museum anyway.

With that in mind, I dashed off to Mumbai's mecca of all things gizmotic—Heera Panna at Haji Ali. Making my way through the crowds of window-shoppers, I walked into the shop that had the most models on display. The smiling chap at the counter introduced himself as Amit, and asked what I wanted.

I meekly asked for a phone that had a camera and some other stuff thrown in, such as Bluetooth, GPRS and radio, and if possible an MP3 player. Pat came the reply, *"Budget kitna hai?"*, which in consumer-speak roughly translates to, "How big a hole in your pocket do you want to burn?"

Lying through my teeth, I told him that money was no object, and that I wanted a phone that would take care of my needs and look good.

A Nokia 6600 was placed in front of me, the same one I'd seen on TV: it was Rs 21,500. Latest *maal*, and the most selling at this time. Camera, organiser, Bluetooth—the works. Ah well, don't you have anything better than this, I said. He went on to show me a Sony Ericsson P900, one of the best smartphones available today: Rs 35,000. Anything similar, I prodded further. Sure, the Siemens SX1 at Rs 27,000 was available. Giving Amit the 'maybe I'll buy it' look, I began to scour around for more exotic choices.



Mahesh Benkar

Soon enough, I found one that had the 02 XDA on display, for Rs 45,000. The 02 XDA features Pocket PC tools such as Word, Excel and Media Player, and has an Intel StrongARM 32-bit processor with 64 MB of RAM, plus expandability options.

Needless to say, I was hooked. But this was more of a PDA than a phone. And it didn't have Bluetooth. I asked the friendly guy at the counter if he had anything else. He could only churn out some Sony Cliés and a Zire 71, which didn't interest me.

So my journey continued. In another shop, I got to look at the Handspring Treo 600, which has not yet been officially introduced in India. At Rs 36,000, it was priced like the Sony P900, but features such as Bluetooth were missing. The Tungsten W was Rs 22,000, but again there were drawbacks. Like most of its counterparts, it lacked Bluetooth. Plus, you can only speak into the phone if you attach the headset, and the processor is slow.

This was more than enough research for me, and I got back to where Amit sat smiling. I asked him to show me the Nokia 6600 and the Sony Ericsson P900. I had narrowed the choices down to these two, though the Siemens SX1 does have features similar to the P900. The 6600 is a definite looker and also has features, but it can't record video for more than 9 seconds. Plus, on the P900, you can flip open the keypad so the full screen is viewable; you can also take videos horizontally.

Yes, the Sony Ericsson was worth it. I asked about the warranty. Amit's basic premise was I would get a one-year repair warranty, but no replacement. So I asked for an absolutely new piece which was brought in and given to me right out of the box, which I checked to ensure that all was right, before paying and making my exit from the place.

Amit was still smiling.

BUYING TIPS

- Before you splurge on a smartphone, make sure you really need it. If you need a mobile phone, get a mobile phone. If you need to take notes at the drop of a hat, or if you need to check out stock prices on the go, get a smartphone.
- If you're getting a really worthwhile features, but need to spend a couple of thousands more, go for it.
- Make sure the features on your smartphone include options for easy connectivity with your PC, and expansion options such as memory cards.
- Take your time to check all the functions, because in the shop is the only time you can get a replacement if something doesn't work right. If the mobile stops working even the very next day, you can only get it repaired, not replaced.

audio video entertainment

Have a blast of a time, with streams of the entertainment kind

"Streaming is so cool!" exclaims Rajesh Lamba, a cyber cafe owner in Mumbai. "At least five people who come to our cyber cafe love to stream music while they are surfing the Net," he says. "Just the feeling of listening to music while checking e-mails or surfing is refreshing. And with thousands of sources, you can choose what you want, instead of carrying your own CD. I don't think many people know about this, otherwise they would be streaming too," he reckons.

The Internet is changing the way we listen to radio and watch TV. Online radio stations let you choose your listening content while their TV avatars—read streaming video services—let you watch to your taste.

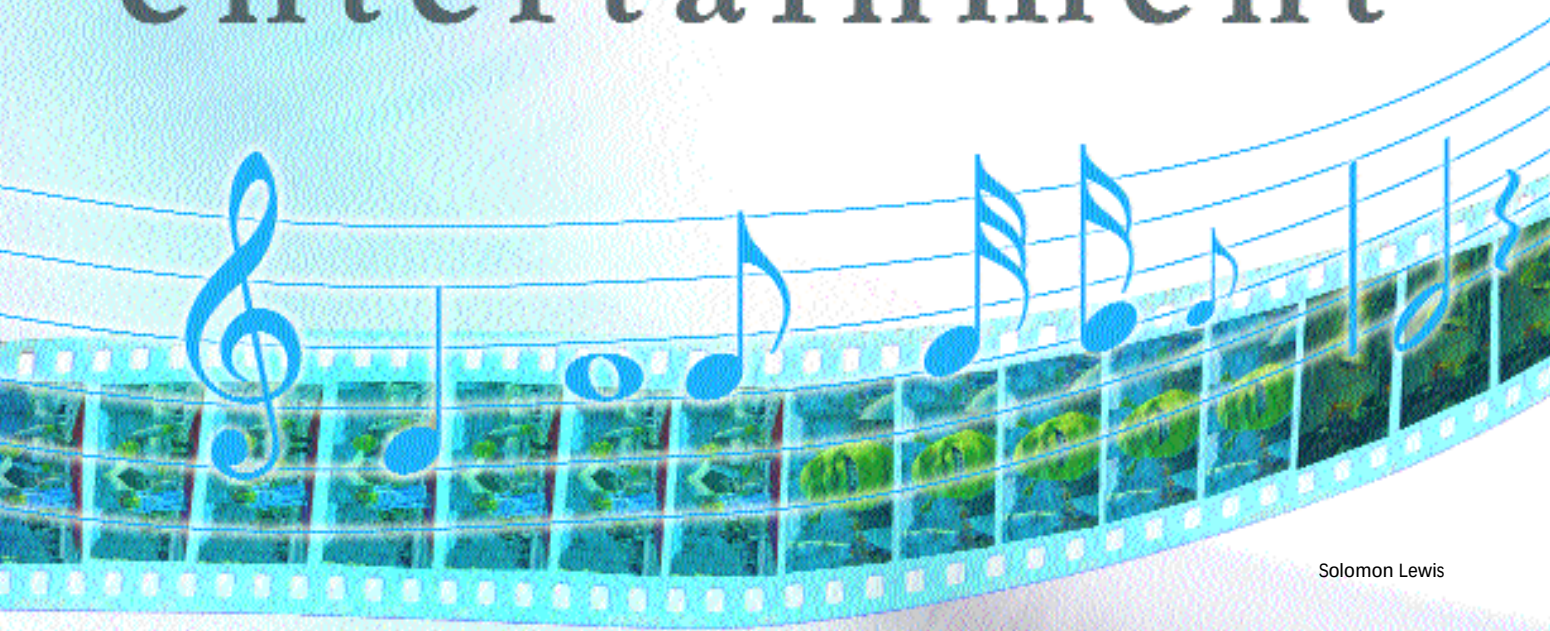
Put on your blue suede shoes

Used mostly for audio and video content, streaming is a technology that sends files in continuous streams, which you can access without waiting for them to download completely. This lets you play bits and bytes of the file instantly. Obviously, you need an Internet connection that can download streams at about the playback speed.

You can find such content on the Web either via the listings in software such as Windows Media Player, or accessing Web sites through a browser.

Play that song

Windows Media Player, Real Player and Winamp are the three most popular streaming media players. Old horse Real Player has come out with a new version that oversees the streaming process. Real One Player also has a host of radio stations to offer. Winamp 5's proprietary video format —.nsv—lets you view crystal clear video content.



Solomon Lewis

The Windows Media Player 9 series has revised its codec technology, thereby allowing for smaller file sizes with better sound quality. Its Radio Tuner lists numerous radio stations. You can listen to some—ClassicalMusicAmerica.com, for example—from within the software. Others, such as Ultimate-80s (***www.ultimate80s.com***), requires you to log on to their Web site.

If your Internet connection is slow, and you experience frequent pauses due to buffering, here's what you can do. In Windows Media Player, go to ***Tools > Options***, switch to the Performance tab, and set the buffer time to 60 in the Network Buffering area.

Use Winamp 5 to watch Internet TV. First, to filter offensive content, press [Control] + [P] to bring up the Preferences dialog box. Click on Media Library and switch to the 'Internet Radio/TV' tab.

Here, tick the appropriate rating of the channel you want to see, and click OK. Now, go to ***File > Internet TV***, and then double-click the desired channel.

If radio is on your mind, click ***File > Internet Radio*** instead. Here, you'll find practically every listening option—news, Hindi music, western music, comedy, etc.

As you hit a Web site in your search for channels, you come across another Web address that offers some more, and thus your range of choices expands. You get a lot more channels to peruse than what media player software can offer. However, do remember that most of these are customised for Internet Explorer. Browsers such as Opera may not display them properly.

Do Re Mi...

LAUNCHcast, a unique music service by Yahoo!'s Launch (***http://launch.yahoo.com***), lets you customise your radio stations. It claims to be the only such free service, with unlimited artists, albums and song ratings in tow. However, you can only listen to 400 songs per month. Beyond that, restrictions such as a ban on further customisation apply. To use LAUNCHcast, you need to have Internet Explorer 5.5 or higher, and at least Macromedia Flash 6.0.

Iceberg Radio (***www.icebergradio.com***) is another online station worth tuning into. It has around 250 channels, distributed across categories that include Comedy, Oldies, Opera, etc. Do remember that you need to register—for free—before you sing along. BBC (***www.bbc.co.uk/radio/***) also has several music channels guaranteed to keep you hooked.

Sa Re Ga...

With sections named Forthcoming, Instrumental, Classical, Meditations, Pop, Oldies, Ghazals, Remixes etc., Smashits (***www.smashits.com***) has one of the largest collections of Indian *sur*. Regional music finds its place here in sections devoted to Bhangra, Bengali, Carnatic, Gujarati, Kannada, Malayalam, Marathi, Tamil, Telugu and north Indian classical music.



Find a big collection of Indian music at www.smashits.com

Its radio stations are sorted by singer, music director, actor or actress, year of release, etc. That isn't all—there are movie trailers, song clips, screensavers, wallpapers, jokes, astrology, and even e-greetings. Register for free, and create WebCDs—online albums comprising numbers of your choice!

Although Raaga (***www.raaga.com***) has a smaller collection than Smashits, the audio quality is slightly better. It has three sections—Hindi, Tamil and Telugu. Here too, albums are grouped by actors, actresses, singers, music directors, etc. You'll also find lyrics of selected songs.

In the mood for some Bhangra? PunjabiSongs.com (***www.punjabisongs.com***) is just what you need. Apna Radio (***www.apnaradio.com***), too, has some decent Punjabi fare. Groove to the beat of Indian folk music at Beat of India (***www.beatofindia.com***). Music India OnLine (***www.musicindiaonline.com***) and the music section of AllIndianSite.com (***www.allindiansite.com***) are also worth a mention for their collection of Bharatiya Sangeet.

Views on news

Think news, and you probably think BBC; so head to ***www.bbc.co.uk/radio***. It has news channels in 42 languages, including BBC Hindi. CNET Radio (***www.cnetra-***

dio.com) gives you your dose of technology, peppered with video and audio news, analysis and interviews.

Another news radio Web site is ABC News Radio (***www.abcradio.com***). CNN's Videos section (***www.cnn.com/video/***) and BBC's Video Nation (***www.bbc.co.uk/videonation/***) put up crisp, concise, video clips from their reporters across the world. Indiatimes' Talk Radio (***http://talkradio. indiatimes.com***) gives you news from an Indian perspective.

If music is the only world you're bothered about, then Yahoo's Launch is just the Web site for you. It has sections for artists' photos, lyrics and interviews. Launch also archives its articles.

I'll be watching you

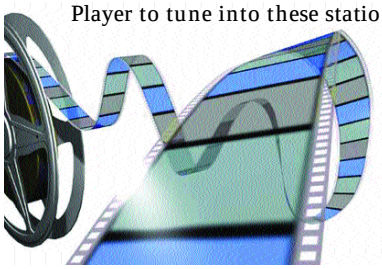
Blastro (***www.blastro.com***) is known for its huge music video collection that's categorised into Hip Hop, R&B, Pop, Dance, Electronic, Rock-Metal. You can use either Windows Media Player or Real Player to watch them. You can also launch the external player if you don't want to see the video embedded in the browser. Blastro also has movie reviews, and a few TV shows that you can watch for free.

Yahoo! Launch also has a slew of the latest music videos for free viewing. As a guest, you are confined to two videos. For more, you'll need to register, free of cost. You need Windows Media Player to play these. Launch maintains a list of the top 100 videos, based on user hits with new videos added daily in the 'New Music Videos' section. You can also submit your own music videos for listing. However, you will need to send these on videotape, and not in electronic format.

Other music video destinations worth a mention are Rolling Stone (***www.rollingstone.com/videos***), Video-C (***www.video-c.co.uk***) and Music Brigade (***www.musicbrigade.com***). iFilm (***www.ifilm.com***) is a good place for movies, trailers, clips, short films, stunt clips, funny ads and TV clips.

Where do I go from here?

If you're in a quandary on what to choose, since just about everything sounds super, a radio directory is what you need. You can start off with Real Guide Radio (***http://radio.real.com***). It has thousands of links, categorised into different sections. Of course, you need Real Player to tune into these stations.



Another good place for perusal is About.com's Radio section (***http://radio.about.com***). It has a horde of links to Internet radios, radio news, streaming software, and lots more. Flip2it (***www.flip2it.com***) is a directory of Webcasts and Internet radios classified into Movies, Arts, Science, Computing and so on.

The next time you go a-cruising, let these radios and TVs rev up your spirits. A dial-up connection, with a decent speed, will just about help, but a broadband connection will accelerate the experience to a high.

Slow Net speeds warrant a choice of stations that broadcast at lower bit rates. You may have to compromise on quality, but that's better than listening to chopped bits as the numbers buffer up.

And yes, as you decide on the station and the service, don't forget to post your experiences at the Digit Readers' Forum (***http://www.thinkdigit. com/forum***).

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1/2 page V AD

Beyond Barcodes

Someone's taking those little black and white bars on your bag of chips further...



You just can't beat a great idea. The basic barcode, or the Universal Packaging Code (UPC), first introduced in the early 1970s, is one such. UPC barcoding was the first standardized product identification system. It's simple and easy to implement: with no effort, you can barcode everything from groceries to books and clothes. The white and black bars require just a quick scan to update the status on the inventory tracking system.

The idea is to allow manufacturers, wholesalers and retailers track products and shipments. Whether it's a supermarket checkout line or your local British Council library, barcodes have found use in all kinds of places.

Intelligent stripes

Radio Frequency Identification (RFID), married with today's Enterprise Resource Planning (ERP) solutions, may soon be the next big thing in inventory management. The technology provides an automated method to collect product or transaction information. The RFID system works using 'smart' tags, with in-built silicon chips that store data, a reader that scans information from the tags, and the infrastructure to store and analyse the data.

Barcodes made inventory tracking easier, but they have their disadvantages. For starters, each barcode has to be read in individually by the reader. If an entire warehouse-worth of products needed to be checked into a computer, it could mean several hours of work.

Furthermore, the basic barcode is just a tag with data printed on it, and this data can't be updated. Except, of course, by sticking another barcode over it.

This is where RFID tags come in. RFID takes asset tracking to the next level; with smart, intelligent tags embedded in the package, the information on the tag can be scanned and updated automatically by 'readers'. Little wonder that courier service FedEx, and US retail giant Wal-Mart, are looking at RFID implementation for streamlining delivery and asset management.

How RFID works

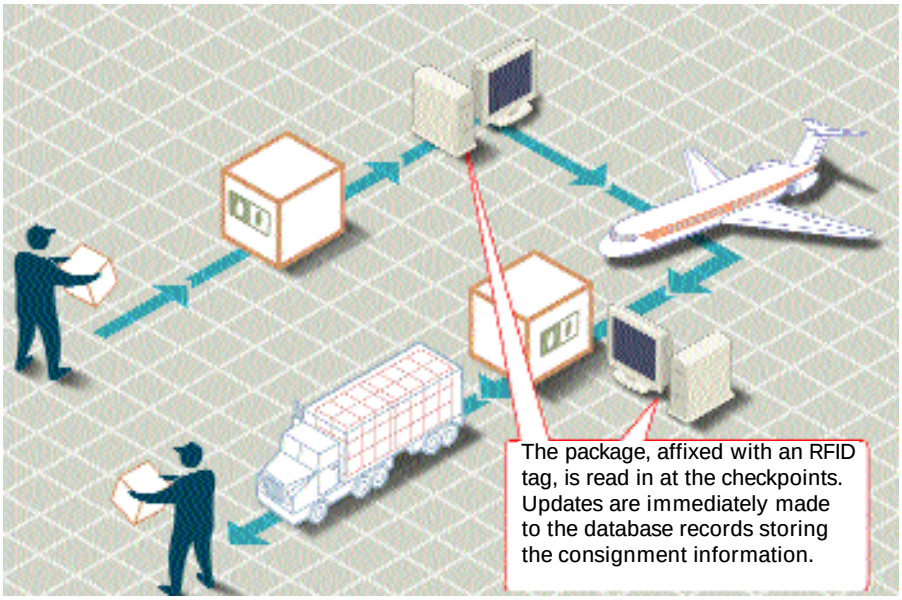
An RFID smart tag has a tiny inbuilt integrated circuit, and a coiled antenna. A tag beams out the information it carries—how far the tag can beam information depends on the operating frequency—and automated reading can be done by installing readers wherever required.

The readers are connected to a computer network. After a reader reads the data from the tag, it passes it to the computing network associated with the RFID system. The network takes this incoming data, and tracks and updates its records. If the tag information needs to be updated, appropriate instructions are sent back to the tags.

Tags are of two types—active and passive. An active tag has its own, internal power supply. This allows them, for instance, to add in new data or modify existing data, independent of a reader. Passive tags have no internal power supply; the same electromagnetic field that is emitted by the reader is used to power up the tag, so that it talks back to the reader.

The advantage is that passive tags can have nearly unlimited life spans, and need not be out of service unless there's a circuitry breakdown. Active tags, though, have a lifespan limited by the

Solomon Lewis



endurance of the onboard battery. They are also more expensive to produce, and are larger.

Readers and tags can use low frequencies—30 KHz to 500 KHz . Low frequencies means lower ranges—up to a few metres. They may use high-frequency communication systems too, such as those in the 2.4 GHz range. These offer far longer ranges—up to 25 metres. However, they're more expensive to build and operate.

RFID in action

The market for RFID solutions is huge. RFIDs can network just about anything—shipping containers, clothes, books and even pets! The manufacturing and retail logistics sectors are big users of current UPC technologies. So are the service sectors that move shipments across the world. RFID would enable them to monitor production and eliminate wastage, since inventory and other data would be real-time. In fact, Wal-Mart has mandated that their top suppliers start using RFID technology, and that all shipping cases be RFID-enabled, come 2005. The US Department of Defence is also considering mandating RFID.

The organised Indian retail sector would be interested in RFID too. So would the Indian transportation logistics sector. S. R. Mallela, Chief Technology Officer of AFL, an express parcel delivery service, says, "RFID, coupled with other technologies, will help us track our shipments from point to point". He should know: AFL is a major player in the Indian logistics services sector, as a leading parcel delivery service.

AFL is considering implementing RFID, coupled with other tracking systems based on Global Positioning System (GPS) or General Packet Radio Service (GPRS), which will help deliver up-to-date information to customers about their shipments.

Despite the substantial investment needed to implement the technology, Mallela points out that the returns in terms of customer benefit make it worth it. Currently, information while tracking a shipment is obtained only when it reaches a checkpoint in the system; an RFID system in conjunction with real-time tracking using GPS, would let customers track their goods on a minute-to-minute basis over the Internet. While AFL is not using RFID-based tracking systems now, they intend to conduct feasibility trials over the first half of this year.

Other RFID applications include tracking farm and wild animals. Animal conservation experts in several places—Africa, for example—already use RFID microchips to track animals habits and to ensure their well being. For example, if an animal is in the same place for a long time, it might mean that it's been trapped.

In a pilot project, the Indian Ministry of Environment and Forests worked on getting RFID microchips implanted in elephants in north-eastern India in 2002. The idea was to create and maintain a database of the elephants and track their habits.

Software giant Patni Computer Systems worked on a pilot of an animal tracking system, using RFID, for a major US-based client, which, in Dilip Dhanuka's words, "tracks the animal from farm to plate". Dhanuka, General Manager of Products and Technology group at Patni Computer Systems , says that the system works using RFID readers and a desktop synchronisation device—a service that allows one to view and control everything from one central location. A Web application allows users to aggregate, synchronise and view data across multiple farms and the abattoir, and also to modify the database.

The readers, also called 'Romeos'—'Juliet' is the desktop synchronisation device—can be interfaced with other external devices, such as thermometer sensors.

RFID technology can be employed in security and identification systems as well. In an interesting case, the European Central Bank is

Privacy

Wired Magazine reported early this year that Intel and the Georgia Institute of Technology were working on systems that kept track of senior citizens and their health at any point in time, using RFID. Sounds like an amazing application, but there's a trade-off with privacy. Pervasive RFID could well let Big Brother keep tabs on you. Of course, in the case of Intel and GeorgiaTech, the seniors signed into the program, and the data went only to caregivers who monitored the seniors' routine for any indications of illness.

Imagine RFID-enabled clothes that could keep tabs of your movements and preferences. Worse still, think about RFID tags that could keep tabs of who you interact with, when and where. Most of this, admittedly, is doomsday fantasy material, but deep privacy concerns do exist: if anything can be tagged, and if that tag could keep reading in all sorts of information and potentially spill it out to those who shouldn't have it, privacy is threatened. RFID technology implementation in the mainstream will have to address that before everyone's happy.

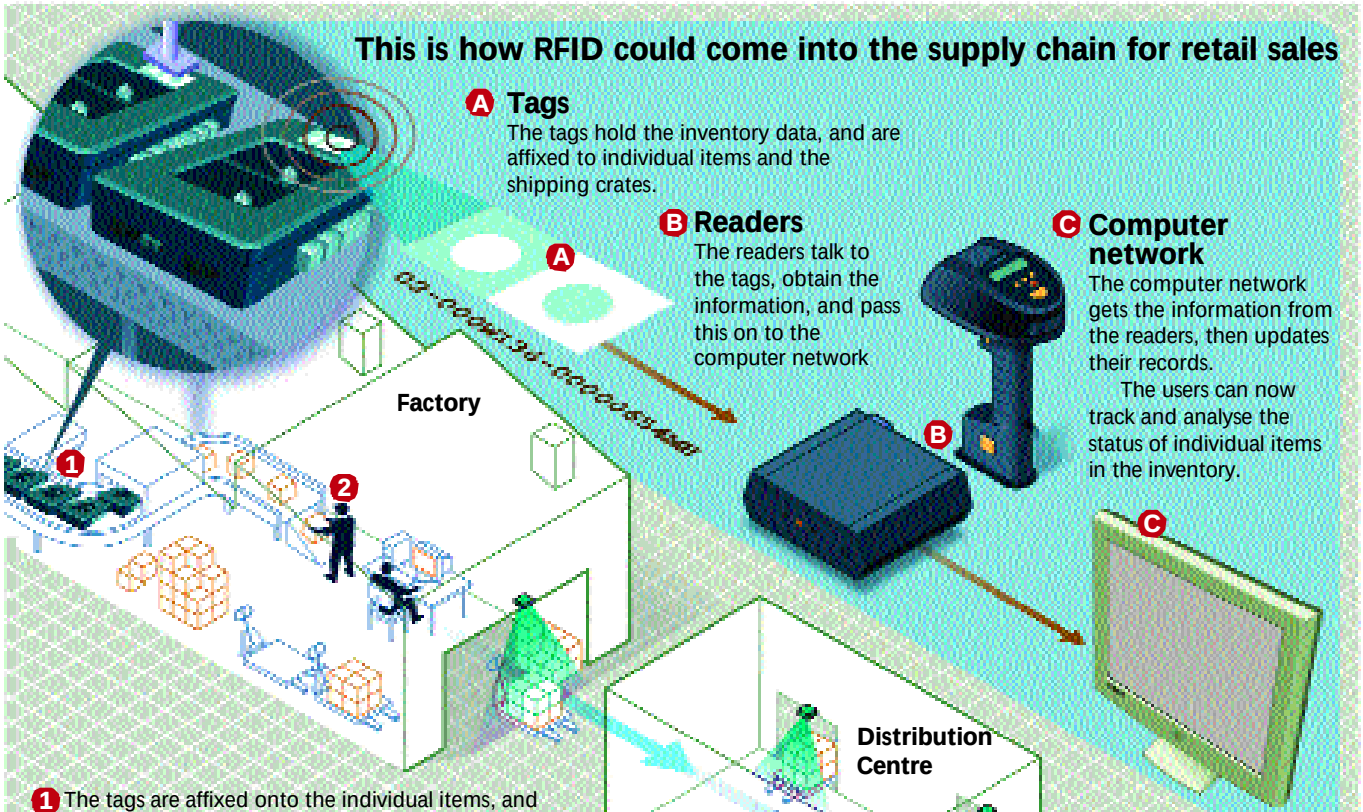
This is how RFID could come into the supply chain for retail sales

A Tags
The tags hold the inventory data, and are affixed to individual items and the shipping crates.

B Readers
The readers talk to the tags, obtain the information, and pass this on to the computer network

C Computer network
The computer network gets the information from the readers, then updates their records.

The users can now track and analyse the status of individual items in the inventory.



1. The tags are affixed onto the individual items, and inventory and shipping data is written onto them.

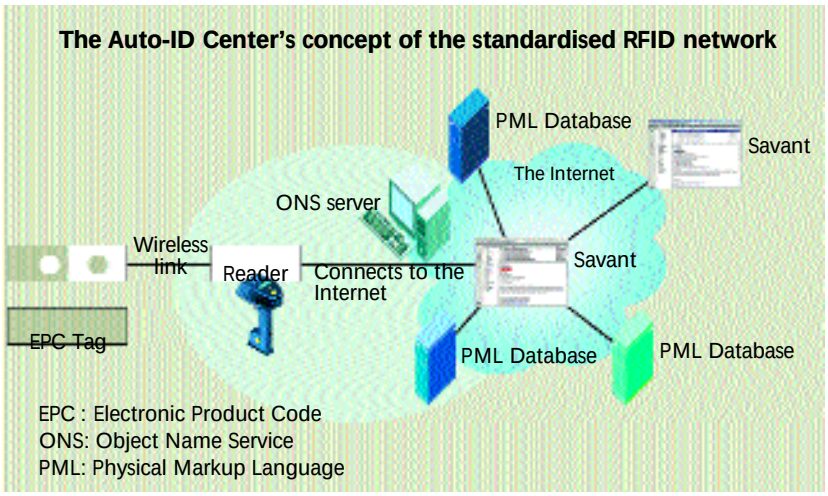
2. The tagged item is crated, and the shipping crates (also tagged) move out from the manufacturer's warehouse to the distribution point…

3. At the distribution point, the tags are read and the consignment is sent to the correct destination…

4. At the destination, the consignment is received, and acknowledged for, and verified by reading in the tags. The consignment is then unpacked and individual items are then made available in the store.

5. While billing the items, the tags are read in, and the data is updated on the network. The tags can then be disabled or removed, and the customer can take the goods home.





The system works by querying the location of the servers hosting the information using the ONS, and then reading in the information on the PML server.

The entire system should be accessible with a computer connected to a reader, and an RFID tag-management software called Savant controls the RFID-related data read in.

The end result, as Auto-ID hopes, will standardise and bring down the cost of the RFID architecture, and eventually let EPC take over from the current UPC standard.

Patni's RFID pilot was based on the Auto-ID's framework, and it has a lab manned by supply-chain and RFID consultants. The lab lets them and their customers experiment with RFID deployment, and understand what RFID could mean for them.

even considering putting RFID tags in currency notes to thwart counterfeiters.

In the future, your bank accounts will directly tie into your RFID-enabled cards, and the RFID-tagged goods you buy will be talking straight to the computers that make your bills. All you'd need to do in a supermarket is swipe your RFID-enabled card, pick up what you want and walk out. For some years now, it's been possible to pay highway toll charges in the US and Europe using RFID-based cards.

The problems

The biggest hurdle in RFID' path is cost. RFID readers start off at about Rs 23,000, and the cheapest tags come for about Rs 10. Barcodes are only about 50 paise. Also, there are problems of erroneous data capture. Initially, there were several incompatible RFID standards, which resulted in the technology not picking up in popularity. Other concerns include privacy. (*See box, 'Privacy' on page 125*)

With vast investments, there's been a deliberate move to standardise the technology and create cheap, workable solutions. A recent study by IDC, a global market intelligence and advisory firm in the IT and telecom industries, claims that by 2008, RFID should account for $1.3 billion of the US retail supply chain.

That's a lot of money, but there's a world of information to be tapped in the retail supply chain. For this to work, though, the RFID system will have to be affordable, and that tags should be cheap enough to mass-produce. RFID experts have estimated that the magic number is the 5-cent per tag cost.

At MIT, researchers and industry sponsors formed the Auto-ID Center in 1999, which worked on creating a workable system to manage the data that's out there, for example, in the retail sector.

The result is the Electronic Product Code (EPC). EPC-compliant smart tags will hold just 96 bits of data; this includes a 40-bit serial number, and product and name information, amongst other parameters. Unlike conventional RFID tags, the Auto-ID framework emphasizes on minimal data—hence the 96-bit limit. The entire system will focus on storing the information on a commonly accessible computer network.

Think of it as the Internet of the RFID age, where the system will resolve the product information from the serial number using the Object Name Service (ONS), which is functionally similar to a DNS. The entire information is going to be coded in what's known as the Physical Markup Language, or PML.

RFID's grand entry

Technologies such as RFID will eventually move into the mainstream, perhaps through supply chains at first.

Experts opine that, for a while, RFID will co-exist with UPC. Once contentious issues are sorted out, there's every chance that we could see an example of cheap pervasive computing dominating our environment. Dhanuka says the RFID industry calls 2004 'the year of the pilots'. (2005 is expected to be the year that widespread RFID deployment begins.) So you won't need to wait too long—within the next couple of years, your neighbourhood store could well be tracking their supplies right from source.

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1/4 th pg AD

PRINT, REFILL, PRINT

Don't sell your printer for a new cartridge—refill the old one instead



Atul Deshmukh

An entry-level printer, today, costs no more than Rs 3,000, and that's a great price for a home printer. But that's not the ownership cost, as the hidden costs that surface once you start using the printer will tell you. Cartridges are exorbitant, and sometimes cost nearly as much as the printer itself.

Under such conditions, refills are economical. We tried refilling a cartridge to see if the kits you get provide as good print quality, without harming the printer. Various kits are available in the market, and we settled on the most popular and easily available—the one from Lipap.

The cartridges we used for the test were from the HP DeskJet 3550—our value winner in the home category for April 2004. We printed various kinds of document, such as pure text documents, text-and-picture documents and photographs. We then compared the results to those obtained using the original cartridges.

What you need

- An appropriate cartridge refill kit—available at your local hardware vendor
- A sharp blade or cutter
- A cleaning cloth or tissue paper

Preparation

Before refilling, get all the materials in one place. Remove the refill bottles from the kit, unwrap them and keep a cleaning cloth or tissues handy, for accidental spills.

Removing cartridges from the printer

These steps pertain to the HP 27A and 28A cartridges that are used in the HP DeskJets 3550 and 3650. For other printers, please refer to their respective manuals.

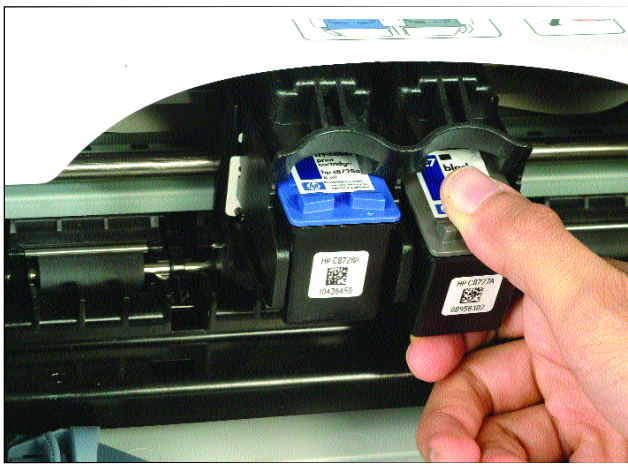
STEP 1 Switch on the printer and lift the top lid. The carriage assembly centres itself right in the middle, allowing for easy access to the cartridges.

STEP 2 To remove the cartridges, apply some gentle pressure in the downward direction, and then pull the cartridge towards you.

STEP 3 Place the cartridges upside down, or on their sides, on a table.

TIPS

- *Do not apply force—just a gentle push in the downward direction is enough to release the cartridges from their locked position.*
- *Do not place the cartridges with their ink nozzles facing the table. Nozzles are delicate and are likely to be damaged.*



Pull out the cartridges without applying force

Refilling the cartridges

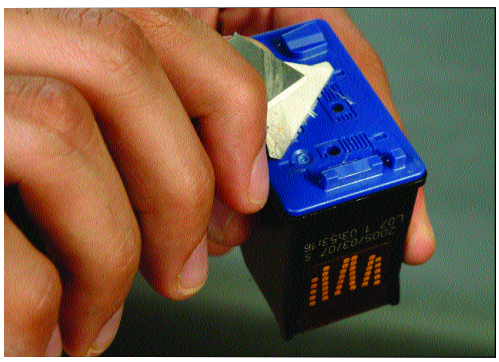
STEP 1 Locate the fill holes on the cartridges. Their position differs from one cartridge to another. Refer to the manual bundled along with the refilling kit for this information.

STEP 2 For HP cartridges, the fill holes are underneath the sticker on the top of the cartridge. Take a sharp object—a cutter for example—and lift one edge of the sticker to expose the holes under it.

STEP 3 You'll see five fill holes. Refer to the refilling manual to find out which one corresponds to which colour.

STEP 4 Now, take a refill syringe. Each syringe is demarcarted into three parts. Each part equals one refill. Hence, each syringe gives you three refills.

STEP 5 Remove the rubber cap covering the tip of the syringe, place the tip near the fill hole and slowly insert the needle as far as it will go.



Peel the sticker from one corner using a sharp blade

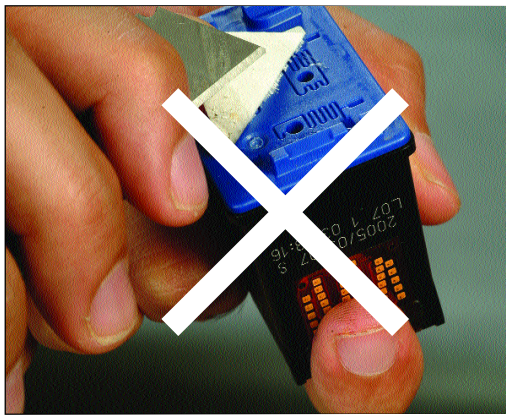
STEP 6 Once the needle is in, hold the syringe upright and open the top cap so that the ink flows down. Close the cap once the ink level in the cartridge reaches the lower mark.

STEP 7 Tilt the cartridge and the syringe to the horizontal position, and pull the needle out.

STEP 8 Repeat the above steps for each colour, and for the black cartridge.



Open the top cap so that ink flows due to gravity



Never place your finger on the circuit when holding the cartridge

TiPS

- Do not remove the sticker completely. Just pull out three-fourths of it, so that you can cover the holes again.
- After removing the rubber cap, hold the refill syringe horizontally to avoid ink spills.
- To avoid wastage, close the top cap before the ink level in the syringe reaches the next marker.
- Do not overfill the cartridge. This can lead to leakage.
- Wait for some time before pulling out the needle so that the ink in it is soaked up by the sponge in the cartridge.
- Before replacing the needle cap, see that there is no leftover ink that might dry and clog the needle.
- To clean the nozzle using the printer driver, go to ***Start > Programs > Hewlett Packard > Printer assistant > Utilities > Printer maintenance > Clean cartridges***.
- Do not wipe the nozzle with the tissue, as this might damage the nozzle. Just place it on the tissue, and apply enough pressure on the nozzle so that it comes in full contact with the wet tissue.

Post-refilling procedure

Put the refilled cartridges back into the bay and close the top lid. Try printing some documents with varying colours and text. If the colours are not properly reproduced, clean the nozzle.

STEP 1 Remove the cartridges as mentioned in the earlier steps, and put them upside down on a table.

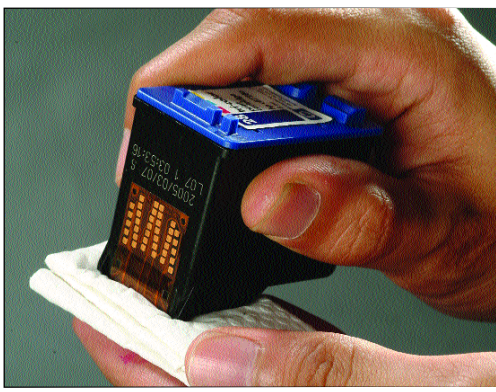
STEP 2 Take out the tissue provided along with the kit, and put some drops of its cleaning fluid on it.

STEP 3 Place the nozzle area on the wet tissue for a few minutes.

STEP 4 Replace the cartridge, and take some more printouts. If the colours appear faded , or you observe horizontal banding, try cleaning the nozzle via the printer driver.

Details	Refill kit	Original cartridge
Cost for colour refill*/cartridge (Rs)	400	1,100
Cost for Black refill/cartridge (Rs)	100	800
Total Cost incurred (Rs)	500	1,900

** Cost includes all three colours; each colour refill can be used thrice*



Place the cartridge as shown above to clean the nozzle

The Results



The refilled cartridge loses out on reproduction of detail (marked in the circled areas), but not too much



Note the level of detail in the circled areas, produced by the original cartridge—it's not so obvious; there's only a subtle difference



An image produced by the refilled cartridge. Note the slight difference in detail, as well as colour reproduction, when compared to the image on the right



The image produced by the original cartridge. Note that all colours—the blue, especially—have been rendered perfectly. Note also the level of detail in the flowers

Analysis

Our analysis looked at two aspects—performance and quality. In performance, we logged the time taken to print our test files. As seen in the results, the differences aren't significant.

Surprisingly, the refilled cartridges did better in most tests. In our opinion, ink characteristics such as viscosity, pigment concentration, etc. vary— hence the difference in the output.

Quality-wise, the results were rather astonishing. There was hardly any difference between the two text printouts. The combi-document differences were significant, with the genuine cartridge yielding better sharpness and reproduction of details.

The refilled ink also took some seconds to dry on normal paper—the media that was used for most of the tests, except the photograph test. This characteristic—drying time—might be what's responsible for the differences in quality between the two combi-document outputs, and in the performance figures.

The photograph test saw minimal differences, and these were restricted to tonal deviation. The near-perfect skin tone produced by the genuine cartridges was lost to some extent when the refilled ones were used. Barring this, there was hardly an error that we could point out.

Overall, the differences between the two cartridges were minimal (refer table alongside), and in everyday use, they'd hardly matter. Moreover, if you refill the cartridge twice—which is what we feel is the safest bet over buying new cartridges—you can easily save enough money to buy a new printer, rather than buying new cartridges, or refilling them for the third time!

Tests	Quality (Scale of 5)		Time taken in seconds	
	Original cartridges	Refilled cartridges	Original cartridges	Refilled cartridges
Text printout—Normal	3.50	3.50	18	14
Text printout—Best	3.50	3.50	140	133
Combi-document—Normal	3.50	3.00	72	74
Combi-document—Best	4.00	3.00	148	150
Photograph—Best	3.50	3.25	395	388

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30Minutes Expert

Lap Sync

Fed up of manual file transfers after tedious business trips? Get in sync ...

Find it on the Mindware CD
Second Copy 2000

You've just returned from a business trip, and start the process of transferring files from your laptop to your PC. With fingers and toes crossed, you pray that everything goes well. As you even sit and search through folders, to see which files aren't already on the PC, you contemplate quitting your job. Fortunately for you, we've got a simple solution. All you need do is let Windows XP's Offline files feature help you out of this predicament.

STEP 1 Enabling offline files

First, go to ***Control Panel > User Accounts > Change the way users log on or off*** and uncheck 'Fast User Switching'. Next, open My Computer, and go to ***Tools > Folder Options***. Switch to the Offline Files tab, and ensure that 'Enable Offline Files' is ticked. Here, you'll also find options that let you decide about synchronising while logging on and off. Note that these affect all the network drives you set for synchronisation.

STEP 2 Map network drives

It's time now to create a network drive. Map a shared folder over the network using a drive letter. On the laptop, open My Computer, and click ***Tools > Map Network Drive***, choose a drive letter, and enter ***'\\computername\sharedfolder'***, where ***'computername'*** is the name of your desktop PC, and ***'sharedfolder'*** is the folder you've shared on the desktop computer. This folder should have read and write access in order to synchronise.

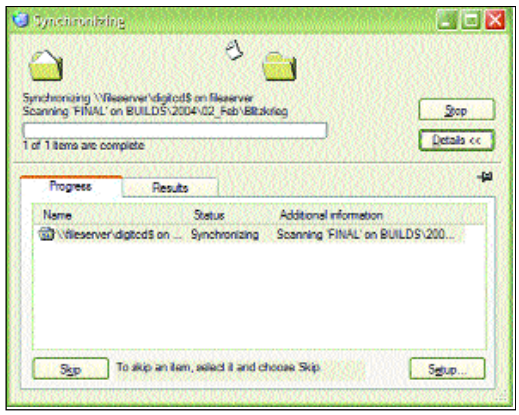
STEP 3 Networking offline

Click on the networked drive in My Computer and go to ***File > Make Available Offline***. A wizard lets you set further options when you do this for the first time. This option is available only by going through the aforementioned path. To disable synchronization for a mapped drive, select the drive in My Computer, and go to ***File > Make Available Offline*** and remove the checkmark.

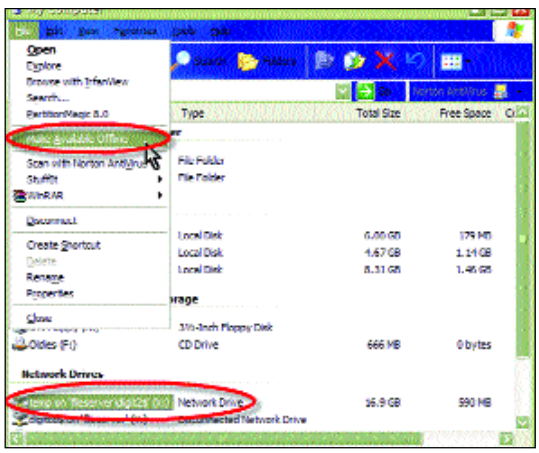
STEP 4 Synchronising

When you first make a network drive available offline, all the files are downloaded from your laptop to your desktop PC. Whenever you re-plug the laptop to the network and log on to Windows, the network drive is synchronised. Synchronisation is done based on the date the file was last modified. Say you created a file in offline mode, named 'somefile.txt,' on May 25, 2004, which was not accessed thereafter. Say another user created a file with the same name in the target folder on the desktop on May 26, 2004.

If you plug your laptop into the network after the 26th, the file on the desktop replaces the one on your laptop.



The Synchronisation Manager gives details of the process



Drives available offline get synchronized once you plug the laptop into the network

STEP 5 Synchronisation Manager

Access the Synchronisation Manager by going to ***Start > All Programs > Accessories > Synchronize***, or just enter ***'mobsync'*** in the Run dialog box. Here, you'll see a number of network drives, as well as Offline Web pages to be synchronized. Select an item and click Setup. There are three tabs where you can specify when to synchronize. The Logon/Logoff tab lets you decide about synchronizing while logging on or off. Use the On Idle tab for synchronising when the computer is not in use. In the Schedule tab, set the time at which synchronization should start automatically.

The third-party way

Third-party software such as Second Copy (***www.centered.com***), Folder Match (***www.foldermatch.com***), etc., also help you orchestrate harmony between your laptop and desktop PC. They also throw in some nifty features such as mass file renamers and duplicate file finders.

Synchronisation saves a lot of grief when maintaining that much-needed accord amongst your work files. Say goodbye to those backbreaking data transfer days of yore!

UPENDRA SINGHAI
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Mexy Xavier

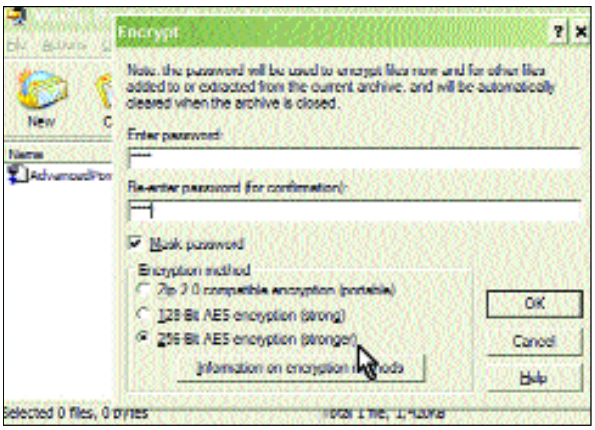
FOR YOUR EYES ONLY

Paranoia about private data is a good thing. Find out how to lock your docs, erase your tracks, and more

Document security is a matter of concern for anybody, and in extreme cases, a matter of high anxiety. You may be a corporate employee worrying about whether prying eyes may lay see your report, or a home user worrying about other account holders perusing your data. Here, then are simple steps that ensure a basic level of protection and security.

Zip it!

The easiest way to protect files is to put them in a password-protected zipped file, using such software as WinZip. With WinZip 9.0, you can secure files, encrypting them with the Advanced Encryption System (AES). This method, also known as Rijndael, has been approved and adopted



Encrypt your files in WinZip with 256-bit AES

by the US Government's National Institute of Standards (NIST).

WinZip has three encryption options—standard, 128-bit AES and 256-bit AES. The less secure standard version is compatible with other applications and older WinZip versions. The most secure 256-bit AES has high encryption and decryption times.

To create an encrypted zip file in WinZip, create a new archive by going to ***File > New Archive***. Enter the filename, and press OK. An 'Add' dialog box will pop up. Select the files you want to add, and click OK. After this, go to ***Actions > Encrypt***, select the desired encryption, enter your password, and click OK.

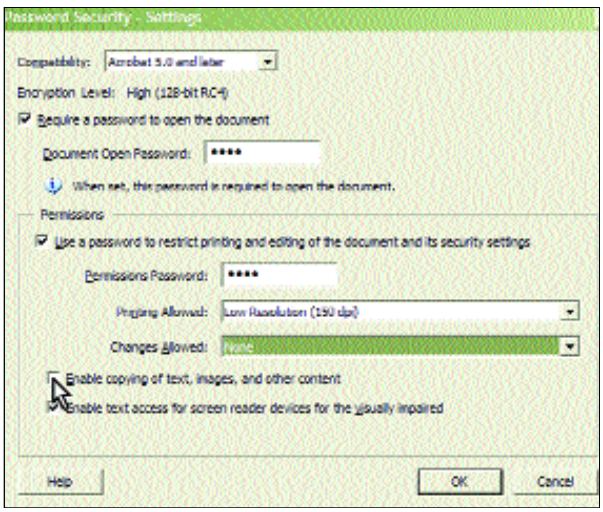
Although you need a password to access files in a protected Zip file, the password is not required for deleting or replacing files from, or in, the file.

Jack of all trades

Portable Document Format (PDF), is another popular way of distributing documents. You can set up different password levels while creating PDF documents using Adobe Acrobat Professional. You can also limit editing, printing and even copying for a PDF document.

To do so, open the PDF file and go to ***Document > Restrict Opening and Editing***. In the Password Security dialog box, select the Acrobat version to open the PDF. To set a password to open the file, tick 'Require a password to open the document' and enter it.

To restrict editing, copying and printing, enable the relevant checkboxes and enter the passwords. Here, as you'll see, you can set other options as well.



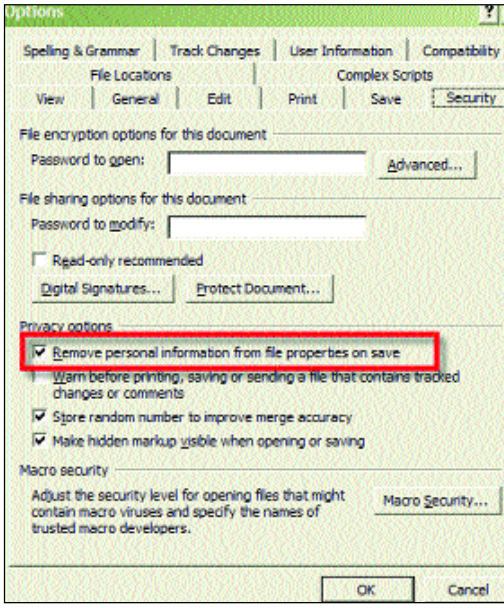
Limit writing to a PDF document using Acrobat 6 Professional

Secure Office

Use the common, humble password to securing Microsoft Office documents. In Word, Excel, or PowerPoint, go to ***Tools > Options > Security***. You'll see two fields to enter a password for the open file. You can set passwords to open and modify. If you click 'Read Only' when asked for the password, the file opens in that mode, and the original file can't be altered. The passwords here are ciphers used by the encryption algorithm.For better encryption, click Advanced, and choose the algorithm you want from the list.

Word stores detailed information, known as metadata behind the scenes about every document it creates. Although metadata is stored to maintain a history of files and aid in searching and retrieving documents, it can become a privacy issue. However, it ensures that proprietary information is not separated from the document. To see what kind of information is stored in Word files, simply open one in Notepad. You'll find information about the file's author and the path to where the file was stored.

To ensure that this data is removed while saving files, go to ***Tools > Options***, and click on Security. Tick 'Remove personal information from file properties on save', and click OK. Changes apply only to the current file. Hence, do this for every file.



Remove personal information from Word documents before distributing them

To remove all metadata, locate the file in Windows Explorer, right-click, and click Properties. Delete all the information in the Summary tab. There are many more hidden things such as 'track changes,' comments and hidden text in Word that need to be removed for total privacy. To show all comments and changes tracked, go to ***View > Markup***. To show hidden text, go to ***Tools > Options***, switch to the View tab, and enable 'Hidden Text'.

Saving previous versions is useful when you want other versions embedded in the same document. However, Word also saves information about who saved the document. To remove this, go to ***File > Versions***. Click the version from the list, and then Delete.

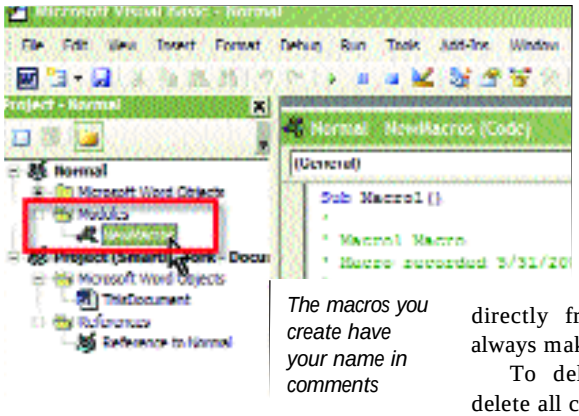
Another feature that might infringe on your privacy is the Fast Save feature, enabled by default. Open a Word document using the Recover Text from any file method explained earlier and you may see information deleted from the file. To disable Fast Save, go to ***Tools > Options***, click the Save tab, and remove the checkmark Allow fast saves.

When recording a macro, its header begins with something like:

' Macro1 Macro

' Macro recorded 3/31/2004 by Upendra Singhai

To delete this, press ***[Alt] + [F11]*** to invoke the Visual Basic editor. Double-



The macros you create have your name in comments

click the module name in the project explorer window. Delete the line that contains your name, and return to Word by pressing ***[Alt] + [Q]***. You can also delete comments from the dialog box that comes up when you click ***Tools > Macro > Macros***.

To restrict editing in Word, go to ***Tools > Protect Document***. In Word 2002, a dialog box lets you choose to protect the document from tracked changes, comments and forms. Word 2003 shows you a task pane coming up with more options to set.

Here, choose specific formatting and editing restrictions, and choose exceptions. Thereafter, click 'Yes, Start Enforcing Protection.' Similarly, protect an Excel Workbook by setting a password, removing metadata, or by setting various options under ***Tools > Protection***.

To remove metadata, go to ***Tools > Options.*** In General, delete contents from the 'User name' textbox, and the dialog box that appears at ***File > Properties***.

If your PC is on a LAN, your username appears in the 'Last Saved' field. This occurs even if you've saved the file after deleting this data. A workaround is to copy the file to your local hard drive, get off the LAN and delete all data as specified above. In general, never open a document directly from the network location—always make a local copy.

To delete more, hidden metadata, delete all comments, headers, footers and hyperlinks from the document. Also, ensure no hidden cells are unprotected. To do so, first press ***[Ctrl] + [Shift] + [Space]*** to select all cells. Now, show all rows and columns by going to ***Format > Row > Unhide*** and ***Format > Column > Unhide*** respectively.

Embedded objects such as a Word document have different propeties than that of the workbook. Remove metadata for them separately. There's another way out: select the object and cut it ***([Ctrl] + [X])***. Then, go to ***Edit > Paste Special***, and choose 'Metafile' format. Press OK to paste it without any metadata. However, you now won't be able to edit the object. Finally, delete custom views by going to ***View > Custom Views***. You should also remove comments from macros.

More protection

In Excel, the layers of protection that control data access to your workbook are not true security features: you can prevent the original data from being changed, but you can't stop anyone from copying data from workbooks. These are thus useful only, for example, when you want to avoid someone accidentally making changes to the data.

To prevent anyone from making changes to any cells, go to ***Tools > Protection*** and click 'Protect Sheet.' This dialog box also allows you to set more options, such as a password to unprotect the sheet, and individual changes that users are allowed to make. This applies to all cells. To unlock specific cells, select them, right-click and choose Format Cells. Then, go to the Protection tab and remove the Locked checkmark.

Go to ***Tools > Protection > Allow users to edit ranges***. Here, define the ranges of the cells that all users are allowed to modify. Click Permissions to choose who can modify the contents.

This is different from the aforementioned lock-unlock method, since it's applicable for different users in Windows 2000 and XP. Secondly, the selected users can edit these ranges without a password. These options come into effect only when you've protected the sheet.

Protecting PowerPoint

Metadata in PowerPoint presentations can be deleted in ways similar to those used for Excel. Go to ***Tools > Options*** and, from the 'General' tab, delete the information you don't want. Then, go to ***File > Properties*** and delete information across different tabs.

If you're on a network, make a local copy of the presentation, disconnect from the network and then delete this information. Disable fast saves by going to ***Tools > Options > Save*** and removing the checkmark that says 'Allow fast saves.' Also delete comments, headers, footers, hyperlinks and comments in macro code as with Excel. Give the same treatment to embedded objects as with Excel, too.

UPENDRA SINGHAI
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Feeling protected?

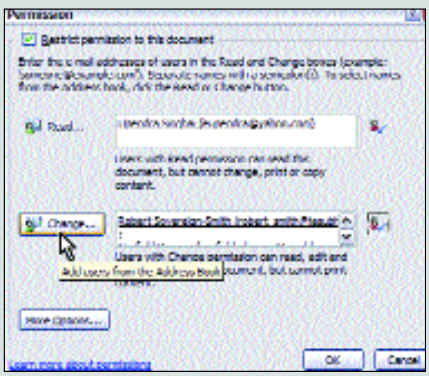
Security is a serious issue, and not just for system administrators. What we've discussed here is a drop in the ocean. Share what you do to make your files secure. Drop us a mail at ***readersletters@jasubhai.com*** or post your comments at the Digit Readers' Forum—***www.thinkdigit.com/forum***.

Information Rights Management in Office 2003

Microsoft Office 2003 Professional allows you to restrict the permissions for the documents you create, using Information Rights Management. You can restrict access to a document even after you send it to someone.

To create restricted content with Office 2003, go to ***File > Permissions*** and select 'Restrict Permission As'. You are asked to install the latest version of the Windows Digital Rights Management Client—a small 345 KB download. You will be asked to sign up for a free trial account on Microsoft's rights management server. Now you see a dialog box where you can specify the .NET passport addresses of the users, and the permissions you want to give them—Read, Change and Full Control.

When users open this file, they will have to sign in using their .NET passport account.



Set the .NET passport identities and permissions for all users allowed to access your file

The extent to which they can work on the file depends solely on the permissions you had set when creating the file.

The Daemons Within

Still using Yahoo! and MSN? Here are some super-simple chat solutions for both office and home

Instant messaging (IM) isn't just used for chatting with friends anymore. It's pretty much a standard intra-office communication tool as well. Why walk a few feet to tell a colleague something, when you can quickly type out a message and hit [Enter], right?

IM depends entirely on the Internet, and this is where the problem begins. What about offices where employees don't have Net access, where dial-up access is used, or where all IM ports are blocked by a terrifying systems administrator?

Here's a simple solution—get yourself a Linux box, install a chat daemon, inform your colleagues and get a big pat on the back from your boss—you've just saved the company some money on otherwise wasted bandwidth.

JABBER

Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!

Unlike Lewis Carroll's proclamation, Jabber is really just a neat way to start your own local chat server. Jabber runs happily on an underpowered rig, provided there's enough network bandwidth.

To get the Jabber server up, you can either choose one of its many open and closed source implementations or, head to Jabber.org and download the JabberD Quickstart server ***(http://jabberd. jabberstudio.org/quickstart/)***. This contains pre-compiled binaries and a neat setup script.

Create a separate user account within a new group, in order to run Jabber. Though not compulsory, this makes sense from a security point of view. Also, install Jabber in a directory with the required permissions.

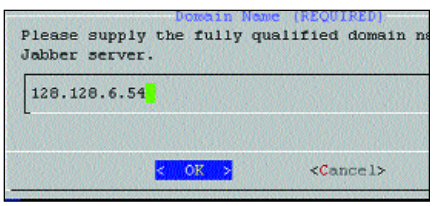
Log in as superuser and run the ***'groupadd jabber'*** command, followed by ***'mkdir /usr/local/jabber'*** to create a directory where you can install and run Jabber. Now, run ***'useradd -d /usr/local/ jabber jabber -g jabber'*** to create the user 'jabber', with the home directory at ***/usr/local/jabber*** and within the group 'jabber'. After all this jabbering, use ***'chown jabber:jabber /usr/local/jabber'*** to get jabber the permissions on the home directory. Copy the compressed Quickstart installer into this directory.

Start jabbering

Untar the Quickstart daemon from the ***/usr/local/jabber*** directory while logged in as the user 'jabber'. You don't need to log in as root while untarring, setting up or running JabberD. Change to the directory containing the extracted JabberD and run the setup script by typing ***'./setup.sh'***

This opens up the General Configuration menu. Here, select 'Gen' and supply a fully-qualified domain name for your jabber server. This can either be a name such as ***gothic.sytes.net*** that maps to the jabber server machine's IP, or the IP address of the Linux box, if you intend to make this sit on a LAN and behind a firewall.

The next, step asks for the name of the server. Press OK to skip. The third screen



Setting the domain name for your Jabber server is simple; just type in the computer's IP

asks for a server description. At the fourth, you are asked for a URL that users can view. Again, these are optional.

Following this, the setup script prompts you for a JabberD server administrator name. Use the formerly created jabber user account, and enter in the server administrator password. Remember, this is not the root password; it's just the JabberD admin password.

Choose 'Yes' when asked to enable PID-file support. This completes the General

No IP? No problem!

All right, you have the bandwidth, and the Linux box in place, but you don't have a static IP address, or a domain that you'd like to tag that IP to. Well, this is how you can work around the annoyance of dynamic IP allocation.

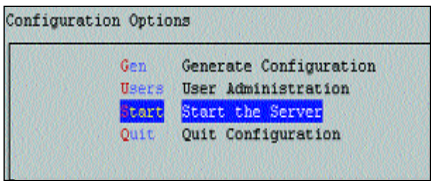
Look up ***www.no-ip.com***—a free service that lets you have a sub-domain under the various domains they own. Sign up, and get your box a name as cool as ***gothic.sytes.net***. Download their tiny application program to get this domain to reflect your changing IP address.

It comes in flavours for Linux, Unix, Windows and Macintosh. Untar the file, run ***'make'*** and ***'make install'***. Enter the e-mail address and passwords you set while registering, and run it in the background. The application automatically gets the current IP address and sends the same to no-ip.com. They update this in the DNS records on the Internet, and voila, ***gothic.sytes.net*** will redirect traffic to your box.



"If you can install the OS, you can install and run an IRCd"

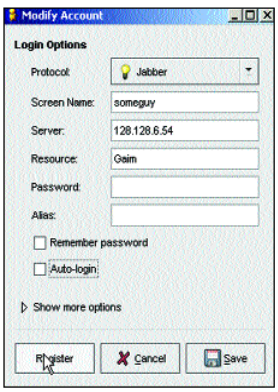
JACKSON LOW (a.k.a. metalrock), MuslRCd daemon developer and final year Computer Engineering student at California State Polytechnic University, Pomona, on the minimum system requirements to run MuslRCd



Finally! Starting up JabberD

Configuration setup; the install script generates the required (XML) config file, and brings you back to the Configuration Options screen.

Before starting the server, select the Users (User Administration) option. Next, select the reg (Registration Settings) option. First up, permit public registration to ease the task of setting up individual user accounts. The screen then asks you if it should inform the JabberD administrator about users making new accounts. This is recommended if you expect a lot of users and their traffic, but for a small departmental chat server, choose No.



Register the Jabber account from within you IM client

Finally, it regenerates the config file returns to the Configuration Settings screen. Now, scroll down, and select Start to kick-start your Jabber server. Discontinue running the setup.sh script once it informs you that the server is running by scrolling down and selecting Quit to exit. Confirm that the server is running by using the ***'ps -aux | grep jabber'*** command.

Fair Gaim

To use the new server, line up and distribute messenger clients. We used Gaim, which works well with RedHat 9, as long as you have resources to run the fancy, heavy GUI. We also installed the Gaim version available for Windows XP. You can use any client and tweak accordingly, but these directions are Gaim-specific.

Once installed, start Gaim and click Preferences. Since we just wish to run a local chat server and not access the Internet, make sure that your Network settings are appropriately set. We didn't indicate the proxy server address, since we ran JabberD on a Linux box using a local LAN IP address. Also, set other personalised settings in the Preferences applet here, and click Close.

Now, set up the Jabber user account. On the Gaim main (Login) menu, click on Accounts, and then click Add to open the Add Account applet. Choose the Jabber protocol from the protocol list drop-down box, and enter a screen name of your choice. In the server option, add the IP address of the Linux box hosting the Jabber server. Ignore 'Resource', and skip the password, for now. Finally, click Register.

A registration window pops up and you are prompted to enter in a new password and other details. Next, click on Register. If all goes well, a pop-up box informing you of successful registration appears.

Finally, sign into the account. Manually add in your buddies to start chatting.

Jabber's easy to set up, real fun and pretty addictive. If you desire connectivity with the rest of the world as well, choose to set up accounts with ***www.jabber.org***. It takes at most 15 minutes to set up the Jabber daemon and clients.

TiP If you have problems signing in, first confirm whether the JabberD server is running. Next, make sure that the server's IP address is mentioned correctly while setting up the account in Gaim—or whichever client you chose. Also, ensure that your PC is on the LAN and is working fine.

IRC DAEMON (IRCd)

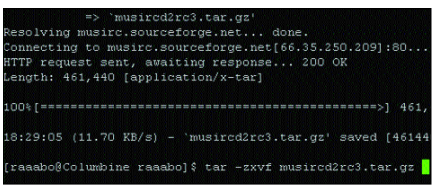
The very nature of IRC makes communication a snap. The channel (chat room) format lets you communicate with a large group or a select group at once, or even with a single user.

The most popular IRC daemons (IRCds) are Unreal, Hybrid, Bahamut and MusIRCd. We'll show you how to set up MusIRCd easily, and connect instantly. The main reason we choose MusIRCd is its stability, low system load and ease of setup. There's even no need to load X—as with most *nix daemons, it's totally installed and run from a command prompt.

You don't even need root access to install and run this daemon; it can run your IRCd on any Linux PC that you have an account on.

STEP 1 Download the file from ***http://musirc.sourceforge.net***. A safe bet is to download the stable build—musircd-stable.tar.gz. So, use the ***'wget http://musirc.sourceforge.net/musircd-stable.tar.gz'*** command.

STEP 2 Use ***'tar -zxvf musircd2rc3.tar.gz'*** to uncompress the file. Type ***'ls'*** to view the newly created directory—musircd. Enter this directory by typing ***'cd musircd'***.



*Use the **'tar'** command to uncompress the downloaded file*

STEP 3 Use ***'./configure'*** to configure the default install. We suggest that you configure the IRCd for small networks, as this optimises the system so it uses less memory for the IRCd—unless you're expecting thousands of users on your server. Type ***'./configure --enable-small-net --prefix=/<Path>'***, where ***'<Path>'*** is the path to the folder you want to install the IRCd in. So, if you want to install the IRCd in, say, ***'/home/raaabo/ircd/'***, type ***'./configure --enable-small-net --prefix=/home/raaabo/ ircd/'***.

Slanging It

IRC users have developed their own language over time. Here's a list of words and their meanings, so that you won't be lost when chatting with someone on IRC:

Phr34k5: Phreaks; most IRC users like to call themselves cool anti-establishment names—whether or not they're actually capable of phreaking

Phreaking: Hacking into a telephone company or network to use their services freely—mostly to make free long distance phone calls

1337 (leet): Really cool; from 'elite'

H4x0r5: Haxors, or hackers

w007: Woot, an exclamation of pleasure; from 'root'

rotflmao: (Acronym) Rolling on the floor laughing my a** off

ne1: Anyone

sp33k: Speak

n00b: Newbie; this is generally an insult

l4m3r: Lamer, a synonym for n00b

5ux0r5: Suxors; something that just, well, sucks!

40l3r: AOLer, meaning a person using an AOL dial-up connection; this is an insult, as IRC users pride themselves on their broadband connections

Operate your Conf

Perhaps the most important part of the ircd.conf file is the operator setting. If you do this right, not only will you be able to connect to your IRC server, but also control it from your IRC client itself.

Before you go ahead with editing the operator block of the conf file, you need to use the ***'./mkpasswd'*** utility to create an encrypted password. ***'cd'*** to the ***/ircd/bin*** folder and type ***'./mkpasswd'*** at the 'Plain text' prompt. Key in your password and press [Enter]. The encrypted password will be displayed. For example, if you type ***'./mkpasswd'***, enter ***'digit'*** and press ***[Enter]***, you'll see something like 'guVwjn80QWx/g' as the encrypted password. If you try the same thing again, the encrypted password that's outputted will be different.

Here's how the first four lines of your operator block should look:

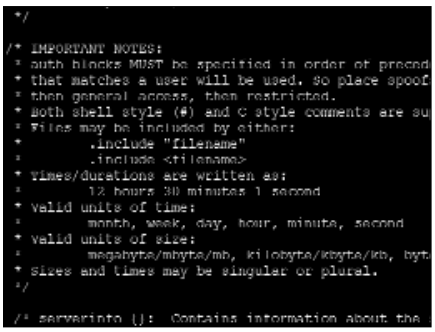
```
operator {
    name = "<Your Name>";
    user = "*@127.0.0.1";
    password = " guVwjn80QWx/g";
```

You also need to remember that if you spoofed your host (127.0.0.1) to something like 'My.Spoofed.Host' in the auth.conf file, the user line should read ***'user="*@My.Spoofed.Host";'***, for the IRCd to recognise you.

Note: Editing a line in the ircd.conf file will let you use plain text passwords instead, but this is not recommended under any circumstances.

STEP 4 Use ***'make'*** to compile the daemon. STEP 4.5 This done, use ***'make install'*** to install the program into the correct directory, and with the right arguments that you specified when using ***'./configure'***.

STEP 5 You'll now find that the folder you wanted the IRCd installed in has been created. Enter that folder. Type ***'ls'*** and you'll see six directories: ***bin***, ***etc***, ***help***, ***logs***, ***messages*** and ***modules***. ***'cd'*** to the ***/etc*** directory and edit the example.conf file using your text editor. We used Pico, by typing ***'pico example.conf'***. Each and every setting is explained in this file with a detailed explanation. Read the file carefully, and change the settings as per your requirements. *(See box 'Operate your Conf', for important administration settings)* Finally, save the file as 'ircd.conf' and quit the editor.



Once you're done editing the conf file, you're all set to start the IRCd

STEP 6 ***'cd'*** to the bin folder, and start the IRCd using the ***'./ircd ircd.conf'*** command. A message saying something like 'MusIRCd-2.0rc3 running in background from <path> pid: <number>' appears.



Starting the IRCd launches it into the background

STEP 7 The next thing to do is connect to the IRCd. We used the command line EPIC IRC client to test our server, which is available at ***www.epicsol.org.*** You can also connect from a Windows computer using the popular mIRC client ***(www.mirc.com)***. Those running Unix-based platforms (Linux, FreeBSD, etc.) may try out the XChat GUI IRC client ***(www.xchat.org)***.

STEP 8 If all goes well, you should connect and see the Message of the Day (MOTD). Now, use the ***'/oper <user> <pass>'*** command to see if you set the Operator settings properly. You can also use the ***'/raw help'*** command for help. If you can connect to the IRCd, you've probably set everything just right.

Even if you don't have a static IP, don't fret. See the box *'No IP? No Problem'* on the first page for details on how you can change your dynamic DNS into a static URL. Once you've done that, call or IM all your colleagues and get them to get on your IRC server. If it's set to run only on the LAN, tell them to connect to ***irc://<your server's IP>:<port you specified in ircd.conf>*** (such as ***irc://127.0.0.1:6667***). Make sure you inform everyone to install an IRC client first.



*Run the **'./configure'** command with the desired switches to personalise the installation*

Jargon Buster

IRC Operators: All server administrators are also IRC Operators, but the converse isn't true. Most server administrators can't be online all the time to maintain their servers. So, they appoint certain trusted users to care for the server. These IRC Operators can disconnect and even ban users from a server. They can also link and unlink networked servers from each other.

Spoof: All users on an IRC server are identified by their user@host, or user@IP addresses. As IRC operators are hated by troublemakers, they choose to protect themselves by faking their IPs. This fake IP is called a spoof, and is limited only by imagination—spoofs such as bill@clinton.gov, or you@talk.too.much are common.

Daemon's end

We installed and ran both the JabberD and IRCd on a Pentium III 500 MHz, with 64 MB SDRAM (though we started with 128 MB of RAM, someone 'borrowed' a 64 MB stick), a 4 GB hard drive, a keyboard and no mouse. We never even installed X-Windows, since the system was grossly underpowered, but then again, we didn't need to. We ran both daemons simultaneously and faced no problems.

So, all you need to do in order to test both these interesting ways of communication is get your hands on some old hardware, load Linux and the two daemons mentioned here, and inform everyone. Happy chatting!

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A screen screaming blue, a partition giving you the blues. Resolve them, and with your work, get glued!

Recover registry in XP

Q. One fine day, as I started up my computer, I got a message that said, "Windows XP could not start because the following file is missing or corrupt: ***\WINDOWS\SYSTEM32\CONFIG\SYSTEM***". What do I do?

Badri Narayan

A To start up your machine without reinstalling, you need to execute some commands at the recovery console. To get to the recovery console, boot with the help of a bootable Windows XP CD, and press [R] when prompted to enter the recovery console. Select your Windows folder, and enter the administrator password.

Once at the console prompt, the first thing to do is back up the existing file; you do so by executing the following commands at the prompt:

md tmp

copy c:\windows\system32\config\system c:\windows\tmp\system.bak

Now you need to replace these files with the proper, non-corrupt files, which are in the repair folder in the Windows directory:

copy c:\windows\repair\system c:\windows\system32\config\system

Now you can boot into Windows XP, but, as this file was backed up when Windows was originally installed, any changes and settings after that are lost. If System Restore is enabled on your system, you can get back to the last restore point.

To do this, boot into Safe Mode with administrator privileges, go to the drive where Windows XP is installed, and look for the 'System Volume Information' folder. Look for a snapshot folder—for example, ***C:\System Volume Information\restore{C0B08955-BE89-4849-ABC0-715FCDE6CE4A}\RP3***. Copy the ***_REGISTRY_MACHINE_SYSTEM*** file to the 'tmp' folder by typing in '***copy _REGISTRY_MACHINE_SYSTEM c:\windows\tmp_REGISTRY_MACHINE_SYSTEM***'.

Go to the recovery console again, using the Windows XP boot disk, and copy this file over the existing one by typing '***copy c:\windows\tmp_registry_machine_system c:\windows\system32\config\system***'.

Restart Windows normally, start System Restore and restore your machine to any point you wish.

Project home studio

Q. I want to set up my own home studio. Can you tell me the best PC configuration to do so?

Rajieve Tanck

A For a home studio PC, we suggest you buy a Pentium 3.2c, an Intel 875PBZ motherboard, 512 MB or more of 400 MHz DDR RAM, a 7,200-rpm Samsung hard drive—80 GB or more, a 9600 Pro graphics card, an Audigy2 sound card, a 19-inch monitor, a floppy disk drive, a keyboard, an optical mouse, etc. If you want a better graphics card, opt for a 9800 Pro XT, 5900 or 5950—which will cost about Rs 35,000.

8X on 4X

Q. I have an Intel D845GBV motherboard with Intel Extreme Graphics and a 4X AGP slot with the 1.5 V specification. Will an 8X AGP card fit and work properly in my 4X AGP slot? I want to buy the latest GeForce FX series card. Can you suggest which one?

My 40 GB hard disk is split into four partitions, with C allocated 11 GB, while D, E and F have 9 GB each. Earlier, I had Windows Me on the C drive and Windows XP on D. The D drive is in NTFS format, and I have now loaded Windows 98 on C. How do I access my D drive when working in windows 98? I have the Windows XP Pro CD.

Jimmy Varghese

A Yes, you can use an AGP 8X card in an AGP 4X slot. AGP 8X supports 1.5 volts, but you won't be able to experience the full power of the card. The GeForce FX from Compro is a good choice in the GeForce series, and has won the Digit Best Value award in 2003.

You can't access your D drive from Windows 98. There are a few third-party utilities that will allow you to do this, but these are not recommended. You will either have to boot into Windows XP to view your data on the D drive, or convert your D drive to the FAT32 format.

Internal and external conflict

Q. I download e-mail from my server using a pop puller, and forward it to the respective mailbox on my local exchange server.

Some users access their mailbox directly from the external mail server. Say my external mail server has the domain name abc.com, and the internal domain name is xyz.com. If I create a new internal domain abc.com, and host my exchange server on it, would I be able to forward e-mail of non-existing e-mail accounts from the internal server to the external server?

Sanket Shah

A You can't have the same name assigned to an internal as well as external mail server. There is an MX record associated with each domain name, which points to an IP address. You can't have abc.com pointing to two different IP addresses. If your external server is abc.com, you need to have a sub-domain such as internal.abc.com for your internal server.

Kabhi on *kabhi* off

Q. I have an AMD K6 processor, 64 MB of SD RAM, a SiS 530 motherboard and a 10.2 GB Seagate hard disk. Recently, my PC started giving me error messages saying, "Fatal exception error in vxd... press any key to continue." When I press a key, the system comes back to normal, but only for a few seconds, and then I get the same message again.

I think it might be due to a virus, but I can't do anything, as my system only works for two to five minutes at a time.

I formatted, and tried re-installing Windows 98 SE, but the problem persisted. Finally, I installed Me, to no effect. I need to leave the system off for over five minutes to be able to use it.

V Shankar Iyer

A Since the problem exists even after re-installing the OS, it looks like you have a hardware issue. You say that leaving the system off for a while seems to temporarily solve the problem. This indicates a cooling problem. Check your cabinet's fans. Make sure all of them are running.

The next suspect is RAM. Try and get a friend's RAM chip (make sure it's compatible with your system), and check stability using that. It could just as well be a bad hard drive or motherboard chip, so check these in turn.

Startup woes

Q. Often, when I boot up my computer, it hangs. If I press [Ctrl] + [Alt] + [Del], I find a few additional entries that are not present when the computer is running. These are: scanregw, rnaap, smc and dbhelp. I can't see them in msconfig either. I want to disable these programs permanently. How do I do it?

Shirish

A rnaap is notorious for causing your type of problem. Uninstall and re-install Dial-up Networking, and if the problem persists, get your modem checked.

If the modem hangs when rnaap is initialising it, your system is likely to hang as well.

What's my voltage?

Q. How do I check the voltages of an ATX power supply. My power supply outputs about 4.5 volts at PS_ON, 5.2 at SB and 0.8 at PG. Please help me check the correct voltages of a power supply before connecting it to my motherboard.

Nasiruddin

A The SB (purple wire) voltage should be 5 V. In the PS_ON state, red and white should read +5 V and -5 V respectively. Yellow and blue should have +12 V and -12 V respectively. Finally, orange should read +3.3 V, and black is the common wire.

XP tyranny

Q. I have a Pentium 4 2.8 GHz PC running Windows 2000 and Fedora core Linux. Recently, I installed Windows XP Professional. Ever since then, I can't boot into Linux. When I start my PC, it gives me an option between Windows 2000 or Windows XP, but no Linux or DOS option. How do I get it back?

Amit.

A Boot your PC with the Linux CD. Type ***'linux rescue'*** at the boot prompt, and press [Enter]. Once you reach the command prompt, type '***chroot /mnt/sysimage***', and press [Enter]. Here

Password hacking

Q. Recently, one of my friends changed my Yahoo! password. When I tried to make my profile, I saw his ID in the alternate ID location. Now, each time I change my password, a message is sent to his account as well. Is he spying on me? How did he change the password? Tell me how to remove his ID from my profile.

Rahul Sarma

A Quite often, we inadvertently give out our passwords. You may have mentioned it in a chat to someone, and the chat was logged. Even more common is using a password that is easy to guess in less than 10 attempts. If you keep your mother's name as your password, you can be sure that almost all your friends can guess it!

Once a hacker logs into your account, he or she can do everything that you can—check your mails, change your preferences, etc.

To remove the alternate ID, go to ***Mail Options > Account Information***, and click Edit. This is located beside the Member Information option. Change the alternate e-mail ID to one of your own and press Finished to save the settings. Now he won't get any of your mails, and you're free to change your password to something he'll never guess.



Mahesh Benkar

type ***'lilo'*** if your boot loader is lilo, or ***'grub-install'*** if the boot loader used is grub, and press [Enter].

Dial-up hackers

Q. I'm worried about my dial-up Internet connection. What happens if someone knows my username, and tries to guess my password over and over again? Will this lock my password? If so, how do I prevent this?
Binod

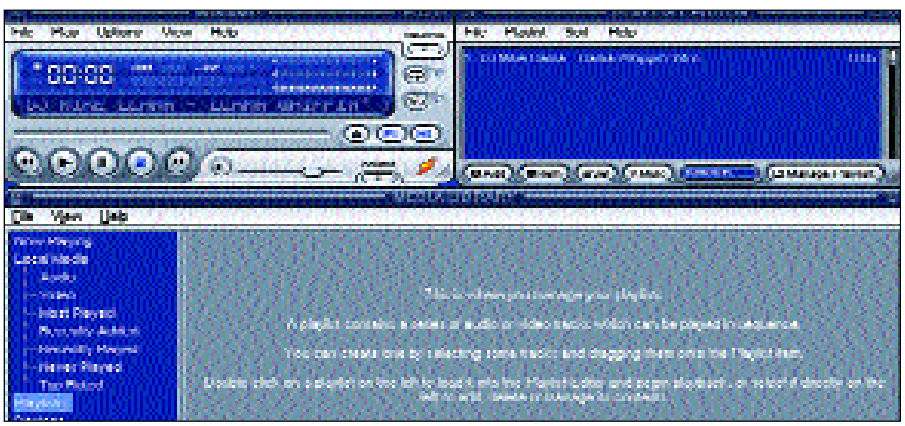
A When someone tries to hack your password using the brute force technique—trying each possible combination—the account is suspended for a preset time period. After 10 or 15 minutes, you should be able to use your account again.

Some ISPs, such as VSNL, offer a feature where you can lock your account usage from a specific phone number. This is good, because unless the hacker is sitting in your house, or hacking your phone line, he or she cannot access your account.

Blue screen advertisements

Q. I have a dual-boot PC running Windows Me and Windows XP. Recently, I started getting an error message during bootup. I took a screenshot of the error. What is the problem?
Agk Nair

A The application specified in the error message—CD_LOAD.EXE—has been installed by Cydoor's adware application. It downloads advertisements to your computer as soon as you go online. Search for the application, and delete it. Also, load an anti-spyware application to keep your computer from facing this problem again.



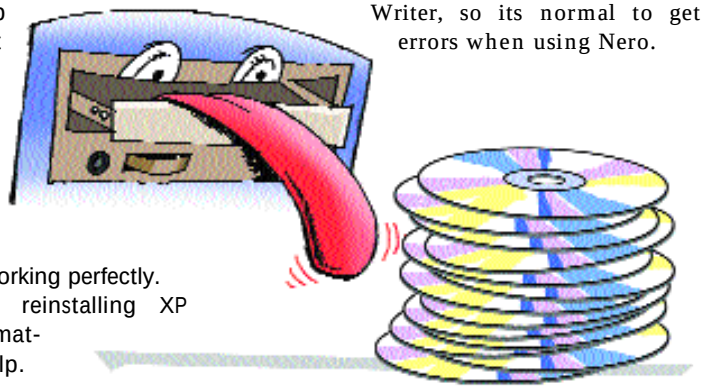
Use anti-spyware to protect your PC from nasty errors such as this one by Cydoor adware

Choosy CD-ROM

Q. I have a Compaq Presario computer with Windows XP Home Edition and a 48x CD-ROM drive. The problem is that the CD-ROM drive only reads the CDs that came with the computer—the OS CD, drivers CD, etc. It completely ignores other CDs, even when there's a CD in the drive, it asks to insert one.

I have tried about eight CDs, all unscratched. I also installed Nero Burning ROM 5 and Image Drive. The help and support says that there is a SCSI problem, while properties in device manager reports the device to be working perfectly.

I've tried reinstalling XP without formatting. Please help.
Siddharth



A Most packaged CDs are pressed, not burnt. These pressed CDs are made so that they work on all CD drives. Certain CD-Rs may not be compatible with your drive. Check your drive by attempting to use CD-Rs from other manufacturers. If this fails, send your drive to a service center, as the problem is a faulty lens.

Nero is CD-writing software, and you have a CD-ROM drive not a CD-Writer, so its normal to get errors when using Nero.

I can't write

Q. My Sony CD-RW CRX175A1 24x/10x/40x shows the 'Power calibration' error when writing, and stops. What is the problem? Do I have to change the CD-RW?
Ravi S

A Power Calibration is controlled by the recorder. Before any write operation, all recorders must do a 15-step power test to determine the optimum power for writing to the CD—this is called Optimum Power Calibration (OPC). During a write, it continues to do this test to get the best write throughout the whole CD—this is called Running Optimum Power Calibration (ROPC). This whole process is controlled by the recorder, but is initiated by programs such as Nero. There is an area on the inner part of the CD for the test and test data information to be stored. You can use this area up to 999 times.

So, when you receive the 'Power Calibration Error' or 'Power Calibration Area full' error message, it's because of poor media, poor power, or a defective recorder. Most often, it's due to bad media, so try using better CD-Rs.

Break the partition

Q. I have a 20 GB Seagate hard drive, which has two partitions of 10 GB each. Since I wanted one single partition of 20 GB, I went through fdisk and deleted the primary and the extended partition. However, the partitions still exist. I also tried deleting them with the help of the disk manager provided by Seagate, but they are stubborn. What should I do?
Y S Samyal

A Yes, parting with partitions can be very frustrating. To delete the partition, first go to the BIOS, select the hard disk

FAQs

Crawling computer

Q. I recently installed Windows 2000 Professional and Office XP on one partition, and Windows XP and Office XP on another. I have a Pentium 4 processor, 850 motherboard and 128 MB RD RAM. When I open Windows 2000, the response becomes slow, and after clicking the toolbar and opening Task Manager, I found Rscmpt.exe consuming 99 per cent, or more CPU time. Please tell me how to get rid of Rscmpt.exe.

GK Chakraborty

A This is a known problem for nVidia display cards, but all you have to do to remedy it, is install the latest nVidia drivers. You can download them from ***www.nvidia.com***.

Broadband on landline

Q. Recently, I have seen many advertisements about broadband on landlines (ADSL) from MTNL. What is the major advantage of this over others, and what is the minimum hardware requirement. Is it true that we can achieve speeds as fast as 256 Kbps on our landlines?

Siddharth Menon

A Yes; you can achieve 256 Kbps, or even more on your phone line. The biggest advantage of ADSL is that you can even receive telephone calls while surfing the Internet, as the data is transferred on a different frequency, which is inaudible. As far as the hardware is concerned, all you need is an ADSL modem, which your ISP will rent to you.

Monitoring the Internet

Q. I work as a network assistant in a company, and we have provided everyone with Internet access. The problem is that some of the staff misuses this facility. They download at will, and also visit indecent sites. How can I keep a check on them?

Zahir Ahmed

A Since you haven't specified the software you're using to share the Internet connection, we'll have to solve your problem by assumption. If your Internet server is Windows-based, you should use proxy software such as WinProxy or Sygate. If your server is Linux-based, you can try qmail, which can give you monitoring capabilities after a few patches.

Create boot CD?

Q. How do I create a Red Hat Linux-9 bootable CD?

Sumeet Saha

A There's a command in Red Hat called mkbootdisk that does this. Use it to create an ISO image of the bootable disk, and use cdrecord, Nero, etc, to create the bootable CD.

To create the ISO image, you'll need to know the kernel version—issue the ***'kernelversion'*** command in a terminal window. Now verify that the folder with the version exists in ***/lib/modules***. If you find that the folder name in ***/lib/modules*** is bigger than that specified by the ***'kernelversion'*** command, use the ***'fullname'*** switch instead.

To create the ISO image, issue the '***mkbootdisk --device boot.iso --verbose --iso <full kernel version>***' command. Once the ISO image is ready, burn it with the help of CD-recording software, and voila, you have a bootable CD!

Bad sectors

Q. When I try to install Windows XP, I get an error that says, "Setup has determined that drive C: is corrupted and cannot be repaired". The hard disk does contain some bad sectors. I have a Pentium 4 1.6 GHz, VIA VT8751 (P4M266) and Windows 98 SE. I have a Samsung hard disk with four partitions—C(37.2 GB), D(9.19 GB), E(9.19GB), and F(9.45 GB). What do I do?

Jarnail Singh

A You need to ensure that the hard disk has bad sectors. Download and run the disk utility for this purpose by Samsung from ***www.samsung.com/Products/HardDiskDrive/utilities/hutil.htm***. Execute the program, and let the utility test the hard drive. The program will tell you if the drive is usable or not. If not, then you have to get a new one.

and change its mode from LBA to normal. Now, let the PC boot up, run fdisk and delete the partitions. This done, go back to the BIOS, and change the mode back to LBA.

The notorious SM56 modem

Q. I have run Linux for over two years, from Red Hat 7.3 to Fedora Core 1. I can't install drivers for my modem—D-Link with a Motorola SM-56 chipset. I use kppp to dial my connection. What is the solution?

Naimish J. Makwana

A Motorola provides universal modem drivers for all versions of Windows and Linux. They are available at ***www.motorola.com/softmodem/sm56_download.htm***

Increase the power

Q. I have a Pentium II 333 MHz, a 440 ZX motherboard, 64 MB of RAM and a 6.4 GB hard drive. I want to upgrade the processor and memory. Can I do that on the same motherboard? In all, there are two memory slots, so how much memory can I add? Also, if I change my hard disk, what drive capacity will be supported?

Arvind

A You are in a difficult position, to say the least.

First, the maximum processor upgrade that the 440 ZX motherboard will support is limited to one with a speed of 450 MHz. That is hardly an upgrade.

Secondly, the RAM you need should be of the 66 or 100 MHz variety, which is very difficult to procure. These memory sticks are available in capacities of 64, 128, 256, and 512 MB.

As for your last query, the motherboard can support a 40 GB hard drive.

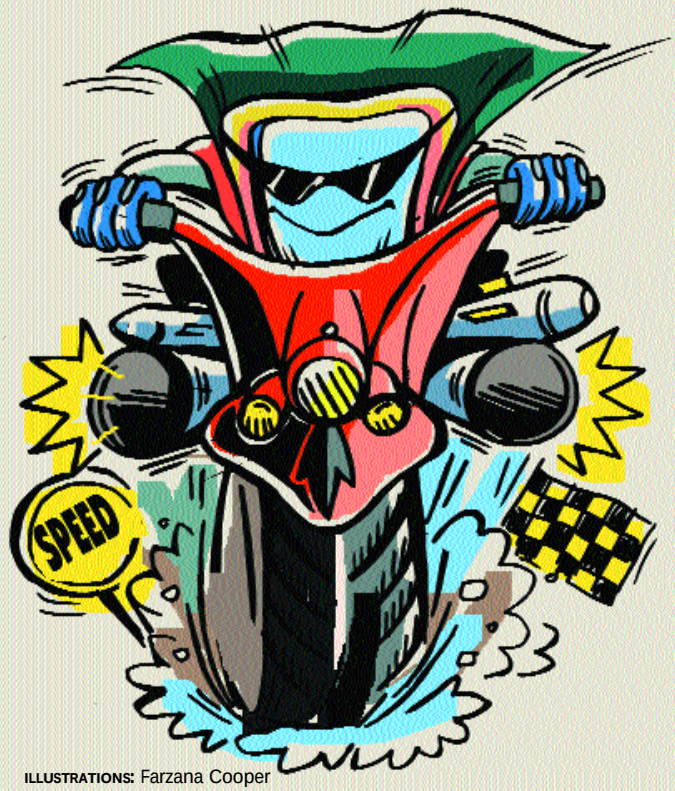


sos@jasubhai.com
E-mail us your computing problems, and we may answer them here!

Since we get more mails per day than we can handle, it may take some time for your query to be answered. Rest assured, we are listening!

tips & tricks

Speed secrets



ILLUSTRATIONS: Farzana Cooper

You don't need the latest hardware and the best configuration for boasting rights. Fine-tune your existing system with these tweaks to race ahead

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HARDWARE

Hardware is the first stop on the Tweak Express. A few right and quick fixes, and your system will surprise you



4

Quickly press ***[Delete]*** as your computer starts up to enter your PC's BIOS. This is where you set your system for better performance—no matter what OS you're running.

Flashers

Before anything else, if your BIOS version is over a year or two old, chances are your motherboard manufacturer has released an updated version that will significantly increase performance and stability. If the flashing process is interrupted, your motherboard will be rendered useless: flashing is therefore not for the faint hearted. Get your system assembler to update your BIOS.

Beyond clock speeds

The first step to overclocking your CPU is to increase the Front Side Bus (FSB). Before you start, ensure you have a well-ventilated cabinet, with at least three fans—one for ventilation, one for the Switched Mode Power Supply (SMPS) and one for the CPU. Increase the FSB in the smallest of instalments—from, say, 133 MHz to 135 MHz. Now change your CPU ratio marginally, and keep testing sytem stability and performance. Of course, this only applies to Athlon CPUs.

Intel locks theirs to prevent overclocking accidents. Don't give in to the temptation of trying to change voltage settings—this will significantly increase the amount of heat produced.

Basic BIOS tweaks

Here are some generic BIOS tips to increase performance. The gains are limited, but the tweaks aren't as risky as overclocking.

Firstly, set the First Boot Device to your C: drive and disable the Second, Third and Other boot devices. On the rare occasions when you need to boot from a floppy or CD, a deft move on [Delete], and changing the First Boot Device option to Floppy or CD will remedy the situation.

Change the 'CAS Latency Time' from 3 to 2—this reduces the amount of time your RAM waits before it starts a 'read' command.

Change the 'RAS-to-CAS Delay' and the 'RAS Precharge Time' to 2—this reduces the delay between signals and lets the memory refresh faster.

Make sure that the bootup virus checking option is disabled to increase boot times significantly.

Disable 'Boot up Floppy seek' so that the BIOS won't waste time looking for a floppy drive. Disable the Video BIOS Shadow.

If you have a graphics card with over 16 MB of memory, disable 'Video RAM Cacheable'.

Set the initial display card as either PCI or AGP, and not 'Auto', depending on the configuration of your graphics card.

Dirty hardware

Cleanliness is next to godliness, even in technology. Keep your cabinet clean and in a well-ventilated area. This is especially important for surfaces such as those of the CPU, GPU and power supply that heat up. As long as these are clean, the heat won't build up.

Use soft paint brushes to clean fans to prevent them from slowing down or locking up, which can cause hardware damage.

Cable chaos

Arrange and tie your cables with rubber bands or cotton threads to prevent entanglement and improve ventilation. Also, try and space hard drives as far away from each other as possible. Consider adding a fan for your hard drives if your cabinet is too small.

Separate IDEs please

A common assumption is that if the hard disk and CD-ROM drive are on the same cable, data transfer will be faster. This isn't true, since data transfer rates depend on Integrated Device Electronics (IDE) controllers, which run at the speed of the slower device. Since the optical drive is slower than the hard disk, connecting them to the same IDE port slows down performance.

Also, transfer speeds between drives on two different IDE channels is faster than that between devices on the same IDE channel.

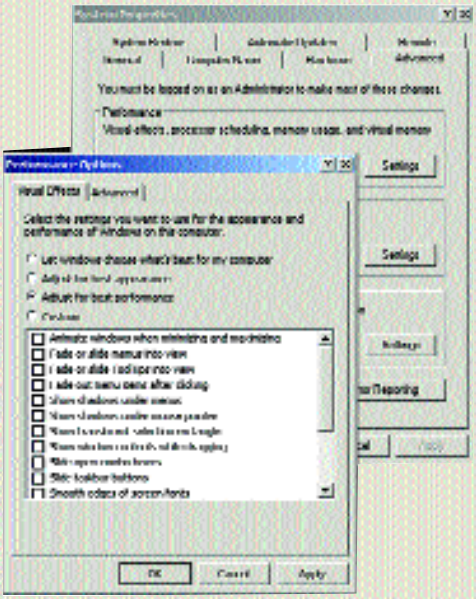
ZD Net India
Where Technology takes you

www.zdnetindia.com/help
Help
Tips & Tricks, Software shortcuts, Q&A know-how,
How to guides, Step-by-step tutorials, Biginner guides

WINDOWS XP

...because your RAM doesn't oblige XP's bells and whistles





From within the System Properties dialog box, you can set Windows XP to give preference to performance. You can allocate its resources to give preference to the programs you run

File system first

When installing Windows XP, make a clean install, as opposed to updating from an older version. This is because formatting your hard drive to use the NTFS file system is better, since FAT32 is slower and less stable. To change your drive's FAT32 file system to NTFS, go to ***Start > Run*** and type ***'command'***. At the command prompt, type ***'convert X: /FS:NTFS'*** and press ***[Enter]***—here ***'X:'*** is the drive you want to convert.

Start with the boot

What you should look to improve upon is bootup time. You can save as much as 30 seconds by optimising your boot options. If only one person uses your computer, leave the password blank. Also disable Fast User Switching by going to ***Start > Run***, and typing ***'control userpasswords'*** and pressing ***[Enter]***.

In the User Accounts window, click on 'Change the way users log on or off'; make sure the 'Use the Welcome screen' option is ticked, and uncheck 'Use Fast User Switching'. Click on Apply Options and close the window.

Prettier equals slower

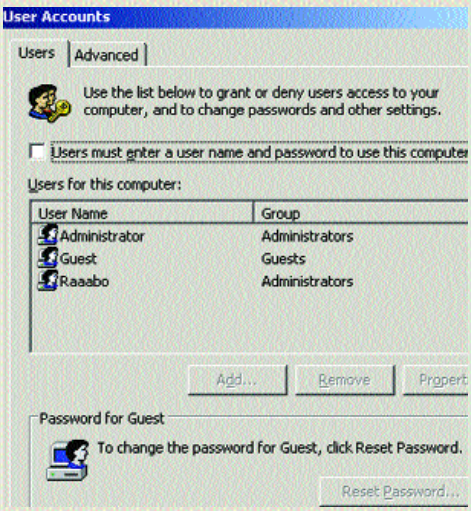
The first thing you notice in XP is the look. Unfortunately, the crisp menus, the new fade-in and fade-out effects and the breathtaking wallpapers drain your system's memory. For any PC with less than 256 MB of RAM and a CPU slower than 1 GHz, turn off all the frills.

The easiest way to do this is to press ***[Windows] + [Pause/Break]*** to launch the System Properties dialog box. Here, click on Advanced. You'll see three 'Settings' buttons. Click the one related to 'Performance'. The dialog box called Performance Options pops up. Under Visual Effects, select 'Adjust for best performance' and click Apply.

Again, in the Performance Options dialog box, click on Advanced. Under Processor scheduling and Memory usage, make sure the Programs option is selected in each case.

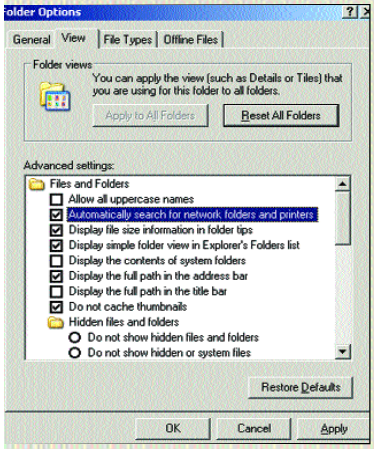
Do away with passwords

To disable logon passwords entirely, go to ***Start > Run***, type ***'control userpasswords2'*** and press ***[Enter]***. In the User Accounts dialog box that pops up, uncheck 'Users must enter a username and password to use this computer'. Since you are doing away with passwords altogether, disable the HelpAssistant account. In the User



If you have only one user on your computer, it makes sense to disable password requirements

ZDNet India
Where Technology takes you
www.zdnetindia.com/virus
Virus Workshop
Virus Alerts, Bug Fixes, Patches, Security

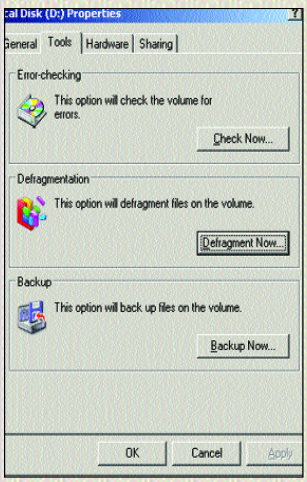


Setting the right folder options will let you work faster in Explorer

check 'Display file size information in folder tips' and 'Display simple folder view in Explorer's Folder list'. Under Offline Files, uncheck 'Enable Offline Files'.

Defragmentation

One cause of system slowdown is fragmented data. When writing to your drive, whatever space is available is filled, so even small files can be distributed all over the place.



Defragment disk drives once a month, for faster data access

Windows may also split large files into many parts and spread them over the hard disk. This is fragmentation. To counter this, you need to defrag your hard disks once a month.

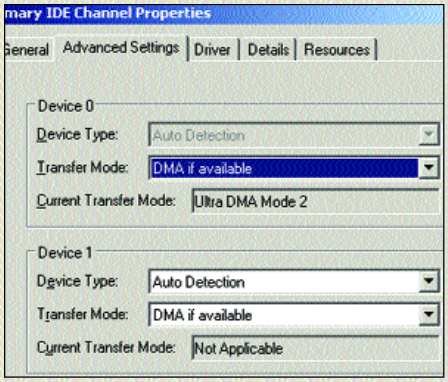
Go to Windows Explorer, right-click on a drive, select 'Properties' and in Tools, click 'Defragment Now...'. When Disk Defragmenter opens up, click Defragment. After the process is done, check your hard disks for errors. In the disk properties box, click 'Check Now...' under 'Error-checking'.

No compression and indexing

Drive compression and indexing is a feature of Windows XP that helps you save space and search your hard disk better—provided the drive is formatted in NTFS.

To begin with, if you have slower 5,400-rpm drives, or an older, slower computer, it's better that you leave these features turned off. The easiest way to check if this is enabled, is to double-click My Computer, right-click on an NTFS drive and select Properties. At the bottom of the dialog box that pops up, you'll see two check boxes called 'Compress drive to save disk space' and 'Allow Indexing Service to index this disk for fast file searching'.

If you don't search your hard disk for files frequently, you can safely uncheck the 'Allow Indexing Service to index this disk for fast file searching' option. Turning off disk compression, however, is a little more complicated. Not all users have 40 GB and 80 GB drives, and some would rather save every MB of disk space that they can, gladly waiting a few seconds longer for programs to load.



DMA access will let your drives communicate faster with other components

Another thing to remember is that if disk compression is already enabled, and your drive is almost full, turning it off can have unpleasant consequences—prepare to lose a little data. We suggest you turn off disk compression only if you have large hard disks, with space to spare.

If you change any settings, click OK and then make sure to check the 'Apply changes to <Drive>:\, subfolders and files'. You can do the same for all your NTFS drives.

Boost that drive

Go to System Properties ***([Windows] + [Pause Break])***, and then to ***Hardware > Device manager***. Look for 'Disk Drives' and double-click on it. In 'Properties', check 'Optimise for performance' and 'Enable Write Caching on the disk'. Now, go to IDE ATA/ATAPI Controllers, and double-click 'Primary IDE Channel'. Under Advanced Settings, make sure 'DMA if available' is enabled.

Do the same for the Secondary IDE Channel. You'll need to restart for the changes to take effect.

Unwanted fonts and applications

Not only do extra fonts slow down your system, they also increase bootup times. Use a font management tool such as Typograph ***(http://www.neuber.com/typograph/)***. Refer to the Quickstart article—*'Fonts Sans Confusion'*—in the January 2004 edition of Digit for tips to use Typograph.

The same applies to unwanted programs. Uninstall all that you don't need—too many applications slow the system down, even if you have space to spare. All installed programs have associated keys and values in the registry, and references to them are all over your hard disk. Try asking a hard disk that's sorting through 2,000 fonts and applications to hurry up!

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GAMING

Now for some help with your fps...



To make your PC play faster, access the graphics card settings by right-clicking on the desktop and going to ***Properties > Settings > Advanced***. You can tweak all options from here.

OpenGL settings

For faster fps, and a more enjoyable experience, turn off eye-candy.

Make sure all the options in your graphics card settings are tuned for high performance. Set the minimum levels for—or turn off—resource hungry settings such as Anisotropic Filtering, Anti-Aliasing, Mipmap Detail and Vertical Sync.

Direct3D settings

In your card's Direct3D settings, set all eye-candy to a minimum, or just turn the settings off. Here again, turn off Anti-Aliasing, Anisotropic Filtering, Mipmap Details and Vertical Sync. You may need to enable Fog table emulation for nVidia cards to avoid seeing a blank screen.

A clean win

Keep your graphics card clean and airy. All that gaming can really test the hardware, and if you're not careful, be prepared to see a BSOD, or worse still, corrupted files after a rather 'hot' reboot.

The area around the graphics card should be open and cables shouldn't obstruct the fan. If possible, install an additional fan on top of your cabinet. With typical motherboard placements, this new fan will blow air straight onto the AGP graphics card.

Get by with a little help

You can get power-user-type control over your graphics card drivers with third-party tools. These will further tweak your card settings for best performance with decent visual effects.

Radeon users can try out PowerStrip ***(http://www.entech-taiwan.net/util/ps.shtm)***, and nVidia card owners, nVHardPage (***www.nvhardpage.com***). For those still hanging on to TNT and TNT2 cards, we suggest you use older, stable drivers, instead of the latest Detonator drivers ***(www.nvidia.com)***.

The Detonator drivers are optimised for the latest breed of graphic chipsets, and may tax your older cards. Of course, if you can't find the older drivers, stick to the new.

Overclocking

You can overclock your GPU to get better graphics, but there is a limit. Don't expect to get 9800 Pro performance out of your TNT2. There's a very fine line between a faster GPU, and a minor explosion, so be wary. And do bear in mind that overclocking is considered tampering, which voids your warranty. If you have no clue what you're doing, skip these tips.

Using third-party utilities mentioned earlier—PowerStrip for Radeons and nVHardPage for nVidia's cards—you can tweak your GPU. Go to the clock frequency controller in your respective utility, and increase the clock speed and memory speed at not more than 5 MHz at a time. Keep testing for stability and excessive heat emitted by the card.

The performance increase begins to go down as you overclock more and more. Use your judgement to get the optimal setting where the overclocking is moderate and the performance gain is satisfactory. As always, add a few fans to your cabinet before you do this.



Using tools such as nVHardPage can give you that performance boost you require so badly

LAN parties

Before connecting to a game server, close all programs that use the Internet to maximise your connection speed and minimise your ping times. Don't spare even IM applications. Also, exit as many programs and services as you can.

Don't forget the game

Apart from setting the graphics card options, you also need to adjust each game's settings for high performance. This is usually found in the game menu under ***Options > Settings > Graphics***, or something similar. Set colour depths, 'details', and all other such settings to Low.

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Digit Discussion

Share your views with the Digit Community, exchange tips and tricks, look for previous Digit issue etc.

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Some of the smartest users we meet on the forum are long term Digit subscribers. Wait, is there a pattern here?

new topic post reply Digit Discussion Forum Index > General Discussion

View previous topic :: View next topic

Author | Message

ice
Digitized!



Joined: 28 Dec 2003
Posts: 1635
Location: Mumbai

quote edit report

Tweaking UR OS:
1) Get XP antispy (freeware). Block all the worthless services. (It has a description for the services too)

2) Get System Mechanic... Run a registry check and a junk file remover check every week or so. Also, tweak the OS according to your needs., eg, in the Optimization sub-menu, choose startup manager and remove stuff like kernel check and MS Office. Btw, don't delete the entries, just disable them, so that u can re-enable them later…In the Tweak Windows Settings, you can change the options according to your needs. I've enabled Prefetching to monitor bootfile and application launch

3) I use Tweak XP. It has a lot of cool options like cache optimization, hardware optimization—they are all dependent on your RAM, hardware, etc. All you need to do is spend a good 30 minutes with the software.

4) Cable nut (for Net speed) Yes the name says cable, but it also works with dial-ups, ADSL, etc Install it (freeware) choose ***Start > Programs > Cable nut > Css > your connection speed > your OS***. For XP, choose Windows 2000 as the OS.

5) Install Naviscope. It will tell you about your network usage—what goes on between your PC and the Net, block adds, etc. Thus it speeds up the Net and has options of optimizing MTU/RWIN Settings in Windows 9x.

6) Install Hare, and change your kernel to 88-bit. If it isn't stable, go back to 64-bit. BTW, never use Hare's RAM optimizer. It sucks! You can use Hare to change your GFX card options, Prefetching, etc.

7) If you want to decrease your boot up time, install Zoom. Enable boot file caching, and if you don't change your startup files regularly, enable Startup Snapshot, or whatever it's called. It works! Also try BootVis, though I don't guarantee it—it helped me, but didn't help Dexter.

8) This is a big post. Do I get paid for this?

9) Yeah! Defragment! The most important thing is to defragment your drives regularly. Windows defragmenter is slow, so try ***[Windows] + [R***], type ***'cmd***' and press [Enter]. Now, type ***'diskeeper'*** and press [Enter], choose the option that best suits your needs and defragment. My comp defrags itself using this bat file every night at 3:
diskeeper c: -f
diskeeper d: -f
diskeeper e: -f
diskeeper e: -f
My C: is FAT32, so it takes 'bout 20-30 minutes. The rest are NTFS, and take less than a minute each.

profile pm email www AIM YIM msnm ICQ

Deep
Digitized



Joined: 23 Jan 2004
Posts: 324
Location: Mumbai, India

Posted: Mon Feb 23, 2004 10:01 am Post subject: Re: My XP freeze

quote edit report

gauravsuneja wrote:

> My XP freezes so that I can't press even ***[Ctrl] + [Alt] + [Del]***. I have to cold reboot when this happens, especially while using Photoshop.My configuration is XP Pro, 128 MB RAM, nVidia 64 MB graphics Creative sound, 40 GB hard drive. Any answers?

LOL! How can you expect XP to run properly with 128 MB of RAM? Time to upgrade to 384 or 512 MB. Deep

profile pm email www AIM YIM msnm ICQ

ice
Digitized!



Joined: 28 Dec 2003
Posts: 1635
Location: Mumbai

Posted: Mon Feb 23, 2004 3:36 pm Post subject:

quote edit report

BTW Deep, my comp ran beautifully on 128 MB. All I did was:
1) Changed the visual options
2) Disabled the worthless services
3) Made my page file 512 MB, spanning two hard drives
4) Used a RAM optimiser
5) Used Hare

profile pm email www AIM YIM msnm ICQ

XIII
Say Your Numbers

XIII derives its name and base from a famous French comic. You're a secret agent at the centre of a thick Web of deception. You've lost your precious memory, which also happens to be the catalyst of the plot. Steve Rowland, alias *XIII*, is the code name of the agent who has supposedly killed the President of the 'Free World', and who himself is presumed dead.

Almost everyone you meet, apart from the core team you're introduced to, is surprised at your survival... *XIII* starts off with you waking up on a desolate beach, with Roman numerals tattooed on your collarbone. Soon, you realise that a mysterious group, The Twenty, is after your blood. Like fish that don't smell too good, the plot twists and twirls, sucking the very marrow out of your bones.

With every little sensory message such as the sound of an old General's voice, etc, you get flashbacks of your rather unfortunate life. You remember eavesdropping on conversations in grim, grey scenarios. This convenient recollection is the sharp-edged hook of the game. *XIII* is action-packed from beginning to end, and has dramatically executed cutscenes that glue missions together cohesively.

Loads of missions with enough playtime keep your itchy trigger-finger ticking. *The Unreal II* engine powers the cel-shaded delightful graphics, making *XIII* the first-ever FPS to have them. The AI though is predictable and the environment lacks enough interactivity. It's only in the beginning of the game, when your hands are empty, that you feel the need to pick up objects such as a chair, a bottle or an ashtray and knock some heads to gain guns and other deadly items.



How brown is my valley...

XIII features visual sound, a special feature in comics. For example, a guard on the other side of the wall is traversing an area you need to pass. You can attach yourself to the adjacent wall and watch as a "Tap, Tap" text descends and ascends in size and distance according to his location.

Body animations are well drawn too, from the sensual pose of a medical nurse watching you flee for your life, to a maniacal doctor rampaging in rage towards you.

Whereas in other similarly themed games, you'd have one final mission with enough nightmare bots being thrown in to cause a massive system meltdown and enough stealth required to liquify bones, *XIII* borrows from the 'main boss' concept. So, while in some cases you have a mad doctor waving a screen-bending drug in his hand, others are heavily armed hardcore militarists that require brawn and skill to defeat. They have one thing in common though—all are monstrous enough for you to replay and retry till you succeed.

The lead character's voice, rendered by David Duchovny, is rather subdued, and goes down well, giving it more dimension and depth. Rapper Eve plays Major Jones, and Adam West gives life to General Carrington. Sound effects develop tension at a steady pace. The weapons themselves are staple spy diet—you'll get crossbows for stealth missions, snipers, and an awful load of shotguns, AKs and M4s.

Load times, too, are a pain. The main installation itself occupies a generous chunk of space. And you need to juggle four CDs as and when the game demands them. The usual generic save system is replaced by a cumbersome checkpoints system that serve as starting points when you restart your game or fail in a mission.

The storyline draws inspiration from a variety of real-life circumstances. The presidential assassination scenario is all too Kennedy-*ish*. There are similarities in style and concept to other spy-thriller games such as *Splinter Cell*. *XIII* tries to strike a balance between being too brain-racking and overtly simple.

Like any half-baked product, *XIII* does have its juicy parts. Unfortunately, this is in no way a game that keeps you on the floor, on your knees, fists clenched, a tear rolling down your left cheek while doom metal plays thoughts of complete submission... no, it's not this one.



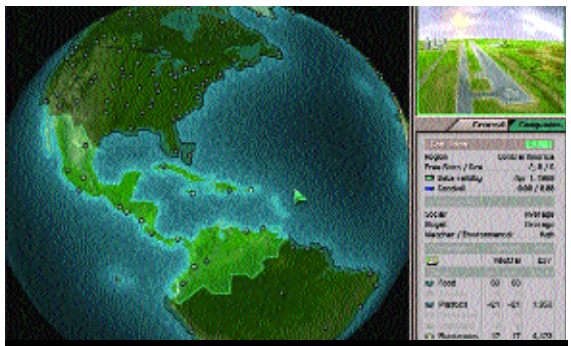
Walk straight and take the left to see Hell. You can't miss it

Genre: Action ■ **Developer:** Ubisoft ■ **Publisher:** Ubisoft ■ **Distributor:** NA
Phone: NA ■ **E-mail:** NA ■ **System Requirements:** 600 MHz CPU, 128 MB RAM,16 MB 3D card ■ **Price:** NA
Web site: www.whoisxiii.com
Rating: ★★★½☆

AIRLINES2

Clipped Wings

The interface of *Airlines2* is very simple, with three main screens sub-divided into several tabbed windows. The airports are grouped under fifteen zones classified by geographical location. Players start out by selecting one region, and then establishing routes and connecting airports together. There are several conditions such as passenger demand, type of service required, etc., that need to be met to set up a profitable route. All this information can be obtained by researching airports, but this research only remains accurate for a set amount of time, thereby adding a good degree of realism to the gameplay. Another nice feature is the inclusion of real-world aircraft in the game, despite their corrupted names, such as the Concoard and the Boodwing 747.



The World as seen from the eyes of an airplane

As the game rolls on from its start date of 1960, planes are refreshed accordingly.

As the game progresses, the increasing strain of micro-managing fifty-odd routes really gets tiresome. Another disconcerting fact is the number of crashes your planes sustain mid-game, and the high cost of replacing them. The game does list the total flying time of the aircraft, but it would have been more useful to include a projected estimate of its useful life. The game's Finance screen too appears a little simplistic—if you need a loan, your bank will allow you to set the interest rates. Also, the competition's progress is reported only once every year. So in the end, you find yourself just sitting and waiting for any event to happen… and waiting, and waiting...

The in-game music though is a different matter, with its horrendous techno sounds in tow. Beyond the simple animations of airports and planes that play in the right-hand corner, the game only looks like a jazzed-up version of an Excel sheet. Business-sim enthusiasts would be better off buying *Airport Tycoon 3*.

Genre: Strategy ■ **Developer:** InterActive Vision ■ **Publisher:** Take2 Interactive ■ **Distributor:** Sujata Softech ■ **Phone:** (022) 22885096 / 46574
System requirements: 500 MHz CPU, 64 MB RAM, 32 MB 3D accelerator card, 350 MB hard disk space, DirectX 8.0a
Price: Rs 299 ■ **Web site:** http://pc.iavgames.com/airlines2/
Rating: ★★★★☆

Vietnam Med Evac

Land, Puhleez!

Based on the Vietnam War, *Vietnam Med Evac* gives you command and control of the UH1 Huey helicopter to go out into the wild, rescue dying souls and relieve their pain. Use the joystick for better control over the Huey. For hardcore FPS players, controlling the Huey will take some time. Taking off is child's play, but keeping the Huey stable in the air and landing it is what makes this game real fun (or frustrating!). Landing is the game's most critical aspect.

The game's a tough nut to crack, the reason being the patience and willpower required to control the flight paths and situations with controls provided. This is what makes up for the average graphics and stupid AI (civilians keep approaching you even when bullets are fired at them).



Nocturnal missions can be a nightmare. Defeat the darkness with a flare or two

The sound effects bring to life the real action around you. The instant feedback you get due to over-pitching or rolling makes you sit at the edge of your seat.

The Huey's gun is hardly accurate—it seems like something that's meant for random destruction. Another grouse is its manual that actually belongs to another game in the Search And Rescue series—*Coastal Heroes*. An AI pilot was also sorely missed, as you need one to fly the chopper if you decide to man the gun if hostilities arise.

Graphics are poor. Mountains, plateaus and even water seem developed for a TNT-based system. All said and done, this game is good value for money, as it'll take at least a month to complete all the missions. It's loaded with around 100 missions, which is enough to make the gamer clock enough flying time to try the real Huey if the chance ever comes by.

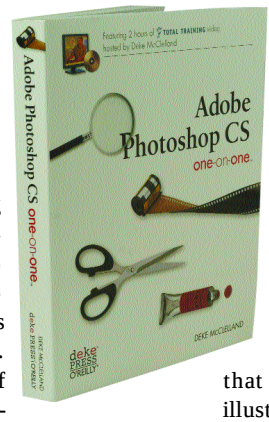
Genre: Simulation ■ **Developer:** InterActive Vision ■ **Publisher:** Global Star Software ■ **Distributor:** Sujata Softech
Phone: (022) 22885096 / 46574 ■ **System requirements:** (800 MHz CPU, 64 MB RAM, 1 GB hard disk space, DirectX 8.1, 32 MB 3D accelerator)
Price: Rs 299 ■ **Web site:** http://pc.iavgames.com/vme
Rating: ★★★★½

Adobe Photoshop CS One-on-one

Beautiful, useful, comprehensive

Photoshop is undoubtedly the most popular tool for photo editing. If you've seen the power of Photoshop, and have been impressed by the magic it can weave, but don't know how to use it - this is the book for you. The CD contains over two hours of video training, as an add-on to the images and other examples used throughout the book. You can get a fair idea of how things are done in Photoshop through the video tutorials, even without reading the book at all.

The book is divided into 12 chapters, and the CD contains 12 video lessons. You're supposed to first go through the video lesson to get the basics of a chapter, and then go through the chapter in the book. The book is primarily meant for newbies, and so, starts off with basics such as how to open files, the Photoshop CS interface, etc. and moves on through intermediate topics to advanced ones. There are over 600 full-colour photos and illustrations, which make learning fun, not to mention the glossy pages and very attractive design and layout.



The beauty of the book lies in the fact that you're never lost, having to look back at a previous chapter, or having to look at the index. The full-colour illustrations amply augment the text. There are screenshots of windows as well, generously sprinkled across the pages, so help is always at hand. And there are instructions on what menu to open, what to click, and so on, on virtually every page, with references to the pictures on the page.

The text and chapters progress naturally, from easy to advanced. You can get through the chapter on, for example, editing and healing, without even knowing at the outset what editing tools there are in Photoshop CS. And at the end of the chapter, you'll honestly be able to say that you can modify a photograph with skill.

Coverage of topics is more than adequate. One niggle for intermediate users is that the book may seem a little too detailed, but newbies won't have that complaint. At the end, it's the layout, illustrations and methodology that make Adobe Photoshop CS One-on-one a winner.

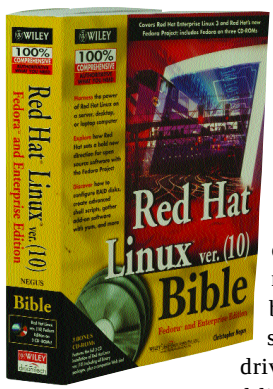
UPENDRA SINGHAI

Publisher: O'Reilly ■ **Author:** Deke McClelland ■ **Distributor:** Computer Bookshop (India) Pvt. Ltd.
■ **Phone:** 2207 6356/0989/5631, 2207 7922/23/24 ■ **E-mail:** cbs@vsnl.com ■ **Web site:** www.oreilly.com ■ **Price:** Rs 1,900
Rating: ★★★★★

Red Hat Linux ver. (10) Bible

Need we say more…

If you've already purchased the Red Hat 9 Bible, this book is not for you. The Red Hat Linux 10 Bible has very little to offer over the previous Red Hat Bible.



That said, the book is a great buy for anybody else. It does not assume any prior Linux or Unix knowledge, and has excellent coverage of topics: the first section starts off with installation and then explains simple day-to-day tasks such as desktop navigation, using the various multimedia and simple networking features available in Red Hat. The chapter on Linux commands covers all the ones used commonly to speed up regular Linux usage.

The second segment is devoted to Linux system administration and does a good job at explaining such aspects as controlling access by configuring users, automating and scheduling system tasks. There's also a chapter comprising useful tips on backup and restore. Apart from a detailed explanation of all the available tools, this chapter also explains the nuances of automating your backups. Also included is a section on backing up to DVD drives using the 'dvdrecord' command line tool. However, it's disappointing to find no detail about configuration issues with the tool.

Finally, the advanced section is for those interested in setting up servers and LANs using Red Hat Linux. It explains the setting up of every form of server—be it mail, Web or news. A small section on wireless LAN setups is provided in the chapter on LANs. This will be enough to understand various issues involved in setting up these servers and possibly help you set-up a basic running server, but they are in no way complete references that will make you a guru of professional server setups.

In all, if you need something that will not only help you come to grips with Red Hat, but also help you out with advanced configuration issues, this is the book for you.

PRAVEEN KURUP

Publisher: Wiley ■ **Author:** Christopher Negus ■ **Distributor:** Wiley-Dreamtech India Pvt Ltd ■ **Phone:** 91-11-23260877
Fax: 91-11-23275895 ■ **E-mail:** wdt@vsnl.net ■ **Web site:** www.wileydreamtech.com ■ **Price:** Rs 529
Rating: ★★★★☆

Where April Fools Dare

An idle mind is indeed the devil's workshop;
six Digit employees found out the hard way...on April 1

Saurabh 'CD' Kumar was sitting around office one boring Wednesday evening, waiting for the CD design team to finish their late tea-break, when he was struck by a brilliant idea for an April Fools' prank. He dashed off to find Mexy 'Flash' Xavier, and lay out his plan. Since no one seems to go home on time here, he ended up with three additional supporters—Prashant 'Brandy' Narekuli (Brand Manager, Digit) Sachin 'Deep Pockets' Kalbag (Features Editor), and Gautami 'Loudspeaker' Chalke (Test Centre).

The next day, six eager 'models' from within the company ranks were informed of a photo shoot for the Digit Forum. Early in the evening, the chosen six were hustled out of their work places; the women were dressed in saris and the men in odd-fitting suits, and told to assemble at the main entrance. The following is the sequence of events that transpired.



Time: 5:12 PM
Scene: Just a group picture of the six models, before we got started with them.
Left to right: Garfield, Rashmeena, Ashrita, Srinivasan, Renuka, Siddharth



Time: 5:24 PM
Scene: "The forum is like an umbrella for all Digit readers!" So obviously, our models had to use an umbrella to symbolise this



Time: 5:32 PM
Scene: Depicting the various users on the forum. Don't miss Srinivasan trying to look imposing, Garfield attempting to look suave, and the ladies looking as elegant as ever. As for Siddharth, he's just being jolly!



Time: 5:32 pm
Scene: Help is always available on the forum —sometimes it's even forced upon you



Time: 5:36 PM
Scene: Take that! Don't forget to wear your helmets, lest you meet these women on the street (The models were asked to depict the verbal duels that the forum is famous for)



Time: 5:39 PM
Scene: Using the forum is child's play, so all our models wanted a 'wollipwop' and cried for their 'mama'—no, not their uncle, their mother!



Time: 5:52 PM
Scene: "April Fool"—Muhahahahahahaha, suckers!
Thank God for chocolate cake, the truly universal pacifier!

BEHIND THE SCENES



Here are the three pranksters directing the models, serious and professional to the core—with scripts and everything. It must have been really hard to keep a straight face
(Left to right: Saurabh, Rohini, Gautami and Mexy)



"You call that a pose?; stop chewing your hair; no, the lollipop doesn't go in your nose; …"
All said and done, the 'models' took it sportingly, in true Digit tradition. Who said geeks live boring lives?

Dennis Ritchie created it in 1972, and Brian Kernighan popularised it. Today, it is the root of some of the most powerful and popular programing languages. What are we talking about?

a. Small-C
b. Java
c. The D language
d. The C language


Dennis Ritchie

2 **EGA stands for Enhanced Graphics Adapter. What does VGA stand for?**
a. Video Graphics Adapter
b. Video Graphics Array
c. Visual GAmut
d. Visual Graphical Appliance

3 **Micheal Robertson of San Diego based company recently announced the release of Linspire, the new name of their current product, changed due to legal problems with Microsoft. What was it originally called?**

a. ELX **c.** KDE
b. Knoppix **d.** Lindows



4 **What is the colour system used by computer monitors?**
a. HSV **b.** RGB
c. CMYK **d.** CYAN

5 **The Creative Audigy 2 sound card is plated with a metal, a matchbox-size piece of which could be flattened to the size of a tennis court. What metal are we talking about?**
a. Gold **b.** Silver
c. Titanium **d.** Platinum

6 **In July 1993, a fire destroyed a Sumitomo Chemical Company plant in Japan. How did this event affect the computer industry?**
a. Millions of ultra-high density floppy disks, scheduled to debut the next month, were destroyed. Because of the delay, the format never gained wide acceptance.
b. Memory prices skyrocketed because a chemical called Cresol was destroyed, which made up 60 per cent of the world's supply of memory casings.
c. Hard drives over 1 gigabyte became scarce for several months.
d. Updates to the v.34 modem protocol were delayed by more than a year.

7 **Photoshop 8.0 is one of the most popular image editing applications around, and is used for all kinds of purposes. What is the code name of this application?**
a. Taconite
b. Dark Matter
c. ImageWiz
d. SwishSwash

8 **How many colours does a monochrome monitor display?**
a. 256 **b.** 2
c. 1 **d.** 3

9 **Calls on a mobile can now be made at rates of less than a rupee, but when commercial telephone service was introduced between New York and London in 1927, about how much did the first three minutes of a call cost, in today's rupees?**
a. Around Rs. 4,000
b. Around Rs. 2,500
c. Around Rs. 1,000
d. Around Rs. 40,000

10 **Global fast food giant McDonald's is now offering a new item on its menu, aimed at technology enthusiasts. What McProduct is now being offered for US$ 2.95?**
a. Softserv Medium with 2 CDs full of custom music
b. Combo Pack with a technology newspaper
c. Wi-fi connectivity for two hours
d. Discounted Dell PCs

11 **Atari designed a computer to rival the Macintosh. The computer offered a 16-bit microprocessor, a MIDI interface, high resolution and more. What was the computer called?**
a. Commodore 64
b. Commodore Amiga
c. Atari 130XE
d. Jackintosh

Answers

Quiz
1: d 2: b 3: d 4: b 5: a 6: b 7: b 8: b 9: a 10: c 11: d

Crossword
Across: 1 Brickin 2 Alan Kay 3 Kildall 4 Babbage 5 Gibson 6 Jobs 7 Lovelace
Down: 1 Bill Gates 2 Alan Kay 3 Kildall 4 Babbage 5 Gibson 6 Jobs 7 Lovelace

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We turn on ideas

did you know

To crack a code encrypted with a 200-bit number, the fastest computer of today would taken more than 5 billion years—as long as the age of the universe

numberette

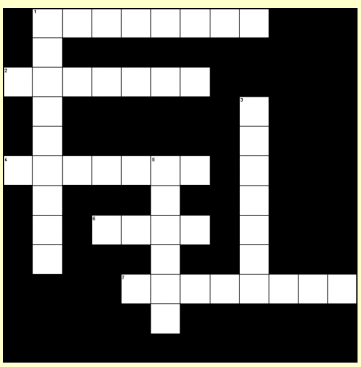
Nerve impulses to and from the brain travel as fast as 274 Kilometres per hour

digit QUOTIENT

1 to 5 Way to go...
6 to 10 Good, if you like being mediocre
11 to 15 Your next job could be with us!

Got an interesting question? Send it in with the correct answer to ***quiz@thinkdigit.com***

This month's theme: Personalities



Across
1. Creator of VisiCalc, the first personal computer spreadsheet
2. One of the fathers of the concept of Object Oriented Programming. Also, conceiver of the laptop computer and architect of the modern windowing GUI
4. Created the revolutionary Analytical Engine
6. Helped create phenomenal products such as the iMac, Mac OS X, iTunes, the Macintosh, and so on
7. The first female programmer

Down
1. Made operating systems easy to use for the average user
3. The first person to interface a disk system to a microcomputer and create an operating system for it
5. Coined the term 'Cyberspace'